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Handbook of Occupational Health and Safety

2nd edition



Treasury
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Conseil
du Trésor

Handbook of Occupational Health and Safety



2nd edition

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FOREWORD


The provision and maintenance of working conditions and environments conducive to the safety and good health of all employees is an important employer responsibility in the management and operation of the Public Service of Canada.

Accordingly, health and safety policies, standards, procedures and guides have been established by the Treasury Board, pursuant to Section 7 of the Financial Administration Act, for application throughout the Public Service of Canada (as defined in Part I of Schedule I of the Public Service Staff Relations Act). This Handbook incorporates all such documents issued to date through Chapter 055 of the Treasury Board's Personnel Management Manual.

The policies, standards and other measures contained in this Handbook are designed to establish appropriate levels of occupational health and safety among employees throughout the Departments and Agencies of the Federal Public Service. It is therefore an important responsibility of Departments and Agencies to ensure effective application of these provisions consistent with their organization, occupational and employee health and safety needs.

Occupational Health and Safety Group
Personnel Policy Branch

I P O L I C I E S



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OCCUPATIONAL HEALTH POLICY

Introduction

1. The value and importance of the good health of Public Service employees is recognized as a matter of primary importance by the Treasury Board. It is intended, therefore, through this Public Service Occupational Health Policy, to promote and provide for working environments and health services designed to maintain the good health and well-being of employees, and thereby minimize the incidence of work-related illnesses.
2. The Policy makes provision for a Public Service Health Program by authorizing the development and implementation of health standards, by providing appropriate levels of professional health services and facilities, and by outlining requirements concerning research, education and training in occupational health.
3. The Health Program will be essentially preventive, and it is neither its function nor purpose to interfere with or displace the services available through practising physicians and other recognized health services of the community.
4. The purpose of this Subchapter is to outline the details of the Public Service Occupational Health Policy, and to provide guidance and direction for the development and implementation of the occupational health program.

Objective

5. The objective of this policy is to provide appropriate levels of health services and facilities, and to achieve and maintain healthful working conditions in order to prevent or reduce the risk of occupational illness.

Policy

6. The provision of appropriate levels of health services, facilities and programs designed to sustain the good health of employees, and the maintenance of healthful working conditions, are accepted requisites and responsibilities in the management of the Public Service of Canada.

Application

7. This policy applies to all Departments and other portions of the Public Service of Canada as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Implementation

Responsibilities

8. The Treasury Board is responsible for the development and promulgation of occupational health policies, standards, procedures and guides, and for evaluating the effectiveness and general application of the health policy and relevant programs.
9. Health and Welfare Canada is responsible for the organization, operation, administration and supervision of the Public Service Health Program, and for the research and provision of health data, information and advice to the Treasury Board.
10. Labour Canada, at the headquarters and regional level, will contribute cooperatively to the Program in a technical and advisory capacity, as required.
11. Departments and Agencies are responsible for:
 - (1) ensuring that the planning and provision of work environments are conducive to the good health and well-being of employees;
 - (2) maintaining close and continuing liaison with Health and Welfare Canada Regional Medical Services Branch Offices in all aspects of health program administration; and
 - (3) promoting the active cooperation of employees and employee representatives in the local operation of the program.

Guidelines

12. The operation, administration and supervision of the Health Program will be carried out by Health and Welfare Canada, principally through the Regional Offices of its Medical Services Branch. Accordingly, all professional Public Service health personnel will be established only under the control of Health and Welfare Canada. Program activities will encompass:
 - (1) the provision of advice and appropriate health counselling services for any special health activities, including those concerned with mental health, employee assistance (alcoholism) etc;
 - (2) the investigation and surveillance of occupational health factors, including physiological, psychological and sociological factors, which may affect the health of employees, and the provision of recommendations and advice to departments concerning corrective measures;
 - (3) the arrangement, co-ordination and conduct of physical examinations and health evaluation of employees, in accordance with Public Service standards;

- (4) the provision of advice to management in the adaptation and selection of work for employees with disabilities, and participation in the design of measures for rehabilitation and re-training of such employees;
 - (5) the provision of advice to management concerning the selection and use of personal protective equipment and clothing;
 - (6) the provision of advice to Treasury Board concerning the development and monitoring of standards, procedures and measures for the prevention of occupational illness;
 - (7) the provision to employees of health advice, health education material and training in health and hygiene, as required;
 - (8) the provision of emergency medical care as required;
 - (9) assistance and advice in the provision of first aid training, and in the verification of first aid services and supplies;
 - (10) the administration of authorized immunization or other special health/medical activities;
 - (11) the provision, in certain cases, of "on-the-job" medical care with the cooperation and consent of the employee's private physician;
 - (12) the compilation, review and interpretation of comprehensive employee health statistics and data;
 - (13) research in occupational health, including factors affecting morbidity and mortality rates among employees.
13. Health and Welfare Canada shall, through their Regional Medical Offices, establish and maintain close contact with all Public Service departments and agencies in matters concerning the operation and administration of the health program. Such contacts shall be established and maintained through the personnel administration offices of each department, and with safety and health committees and other committees or persons concerned with the occupational health and safety of Public Service employees.
 14. To perform their assigned functions efficiently, persons involved in the operation and administration of the program shall be afforded access to work places and be permitted to inspect these at appropriate intervals, in cooperation where necessary with other authorized inspectors. They may also monitor compliance with Treasury Board standards and directives concerning the health and safety of employees.
 15. Health personnel associated with the operation or administration of this program shall not be required to disclose or verify medical reasons for employee absence on grounds of health, and shall observe professional ethics concerning confidentiality and disclosure of all health-related information.

Evaluation

16. This health policy and program will be subject to evaluation by the Treasury Board one year after the date of promulgation and at future periodic intervals, as determined and advised in advance by the Treasury Board Secretariat.

Performance Criteria

17. The criteria used to evaluate the effectiveness of this policy and its implementation will include the following:
 - (1) the principal requirements of the policy, together with all relevant standards, procedures and guides issued by Treasury Board, are applied in the formulation and maintenance of the health program;
 - (2) all required periodic and other health evaluations are being completed in accordance with the appropriate standard;
 - (3) all required occupational health hazard investigations and surveys are being completed promptly, and recommended corrective measures are being implemented without undue delay;
 - (4) departmental personnel are, according to need, receiving appropriate training and advice on matters pertaining to health and hygiene;
 - (5) comprehensive employee health statistics and data are being maintained and reviewed annually, and interpretation of such data is available on request.

Data and Information Required

18. To evaluate the extent to which the Performance Criteria have been met, the following information and data will be required by Treasury Board upon request:
 - (1) copies of current supporting directives, procedures, standards, etc., issued by Health and Welfare Canada, in conjunction with the administration of the health program;
 - (2) data concerning the types and numbers of periodic and other health evaluations completed annually, and an interpretation of such data;
 - (3) data relative to the health training and education of employees, including the number of departmental participants;
 - (4) data concerning occupational health hazard surveys and investigations; and
 - (5) copies of any health program evaluation reports initiated by Health and Welfare Canada.

19. Other relevant information pertaining to the health program, prepared through arrangements between the Treasury Board and Health and Welfare Canada, may also be considered in the evaluation.

THE EMPLOYEE ASSISTANCE PROGRAM

Introduction

1. The purpose of this annex is to provide direction to departments and agencies for the development of an internal Employee Assistance Program. This program is intended generally to provide confidential health assistance or advice to employees who may seek such help, or to those who may require it where work performance is adversely affected due to a health problem. However, due to the predominance of health/behavioral problems related to the misuse of alcohol and the specific techniques required for the identification and treatment of alcoholism, the principles and procedures outlined herein for application by Departments, are directed mainly toward that illness.
2. The Employee Assistance Program is based on the accepted theory that the work environment can be effectively utilized for the early identification and motivation for assistance or treatment of employees troubled with health or behavioral problems.
3. Under this approach, the supervisor or manager is responsible, in the accepted role of work evaluator, not for diagnosis of a suspected health problem, but solely for the identification of the employee whose work performance is consistently impaired (Refer to paragraph 16). This is the most effective method of identifying and reaching an employee who may need assistance due to a personal health problem.
4. Although this program is directed toward assisting employees with any particular health problem which results in impaired work performance, experience indicates that many of the underlying problems identified will be alcohol-related, although other health problems may also be identified.
5. The Employee Assistance approach encourages employees with an underlying alcohol problem to voluntarily seek, or otherwise receive help under the broad concept of the program. Thus, assistance and counselling can be provided earlier than in the case of the individual who is "coerced" into participating in an alcoholism rehabilitation program during the later and more "chronic" stages of this illness, when rehabilitation is most difficult.
6. The Employee Assistance concept is sufficiently flexible to be adapted to apply within a variety of operational methods and settings. Therefore, differences in departmental organization, operating methods and employment settings or tasks will have a bearing on the individual departmental approach to and related directives governing each program.

Objective

7. The objective of this program is to provide for the early identification, intervention and rehabilitation of employees with personal health/behavioral problems which are causing impaired or defective employee work performance, with particular emphasis on problems relating to the misuse of alcohol.

Policy

8. This program and subsequent Departmental directives and procedures shall be developed and administered pursuant to the requirements of the Public Service Occupational Health Policy (T.B. 698074, June 12, 1970) which states that the Government recognizes the value and importance of good health, and particularly the need to promote, foster and maintain the health and well-being of employees of the Public Service. That Policy also authorizes the Public Service Health Program, which provides appropriate levels of professional consultative services and facilities designed to maintain among employees a high degree of physical and mental well-being, and also provides as required, advice for the improvement of the physical and mental adjustment of employees to their work.

Application

9. These program directives apply to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

10. Employee Assistance Program: A program designed to identify, counsel and assist or provide for the rehabilitation of employees with health/behavioral problems including particularly those problems related to the misuse of alcohol.
11. Program Administrator/Coordinator: An individual designated or appointed by a department or agency to direct or coordinate the employee assistance program or an alcoholism program at the headquarters or regional level.
12. Personnel Assistance Counsellor: An individual qualified by experience and/or training in the techniques of early identification and intervention (particularly in respect of alcohol misuse) within the framework of an Employee Assistance Program. The counsellor (which may include an Occupational Health Nurse where available), is designated by a department or agency on a full-time or part-time basis
 - (1) to interview employees;
 - (2) to assess the problem and to determine the type of referral which may be necessary;

- (3) to arrange referrals for specialized employee assistance or health counselling, and for diagnostic and treatment services;
 - (4) to liaise closely with supervisors and Public Service health professionals, as available, during treatment phase and in "follow-up" activities designed to provide employee support during recovery.
13. Alcoholism: The chronic phase of a progressive illness characterized by repeated and excessive use of alcoholic beverages to an extent which interferes with an individual's health and interpersonal relations, and causes impaired or defective work performance.
14. Alcohol Problem: The use of alcohol in a manner or to a degree which interferes with the individual's health, interpersonal relations, economic functioning or societal standing. In the context of an Employee Assistance Program, the problem may manifest itself through impairment or deterioration of job performance.
15. Alcoholic: An individual who has been diagnosed by a health authority to have alcoholism. The term "recovered alcoholic" refers to the person whose disease has been arrested through abstinence.
16. Impaired or Defective Work Performance: May be caused by a health/behavioral problem and may manifest itself in the form of poor workmanship, errors in judgement, misconduct, unsatisfactory or deteriorating personal relationships and in many cases, a high rate of absenteeism.

Responsibilities

17. The Treasury Board is responsible for the development and provision of standards, directives and guides governing the health of employees of the Public Service, and for evaluating the implementation and effectiveness of such directives or guides and the resultant programs.
18. Departments and Agencies shall, in accordance with the provisions of this annex, be responsible for
- (1) the development, establishment and maintenance of an active and comprehensive program for the early identification and referral for treatment of employees whose work performance is impaired as a consequence of the misuse of alcohol or another health/behavioral problem;
 - (2) the development and issuance of a detailed directive to guide all employees in the operation of and responsibilities respecting the program;
 - (3) ensuring that employee representatives are encouraged to participate in respect of the development and administration of the departmental program;

- (4) conducting a program of continuing education aimed at advising employees and supervisors on matters relating to the program.
19. As authorized in the Occupational Health Policy for the Public Service, Health and Welfare Canada will, through its Medical Services Branch and the Branch's regional offices and health units, provide advice and, upon request, arrange for consultative health services in respect to the operation of the program. Such health services are integral with and complementary to the existing Public Service health services facilities. In this regard, Health and Welfare Canada, through its Regional Medical Services facilities and health units, will be responsible for
- (1) maintaining close and cooperative relationships with departmental program administrators/coordinators and counsellors;
 - (2) providing or arranging for initial diagnosis or counselling in respect of alcoholism or other health problems;
 - (3) the provision of health advice and other related information as requested;
 - (4) ensuring that health unit and zone medical staff are trained in alcoholism counselling, rehabilitation and other techniques;
 - (5) acting as consultants to the recognized training authority (departmental or Public Service Commission), in respect of the approval of health/medical aspects in the design of supervisory training programs;
 - (6) establishing and maintaining liaison with community treatment, rehabilitation and recovery maintenance organizations;
 - (7) ensuring the maintenance of confidentiality of all medical information and records relating to this program.

Implementation

20. Departments and Agencies are required to develop and publish individual internal directives and procedures governing a departmental Employee Assistance Program. While the scope or extent of the Departmental Program and the orientation of the related directives or procedures is at the discretion of each department, such program and related procedures shall, as a minimum, be based upon
- (1) the general principles and specific program requirements as outlined in this annex, with specific reference to paragraphs 20 to 36, inclusive; and
 - (2) the principles and requirements outlined in the Occupational Health Policy - Public Service of Canada (T.B. 698074, June 12, 1970) as amended or revised from time to time.

Implementation - General Program Principles

21. The success of the program is highly dependent on the early identification of potential health/behavioral problems among employees, based on the recognition of continuously impaired work performance, or consistently poor or declining interpersonal work relationships.
22. The program requires the active involvement of, and the exercise of good judgement by all supervisory and managerial levels in the identification and documentation of impaired employee job performance which may be caused by a health/behavioral problem, and in motivating employees to cooperate in arrangements for referral for counselling, and where necessary, treatment.
23. Departments should encourage employees to voluntarily seek assistance for a health problem, and without prejudice to job security. However, where impaired or defective work performance has been documented by a supervisor/manager over a reasonable period of time, a mandatory referral will be arranged for counselling and, if necessary, for a health assessment by a health professional, designated by Health and Welfare Canada.
24. An employee will be subject to departmental action appropriate to the circumstances, which may lead to loss of job, by failure to cooperate with arrangements for a health evaluation or a prescribed rehabilitation program, or where, in the opinion of the responsible departmental official, the employee fails to show a satisfactory degree of improvement in faulty work performance.
25. Alcoholism is recognized as a treatable illness for which an employee, when following a rehabilitation program of a type approved by Health and Welfare Canada, is entitled to receive similar benefits and considerations as for other illnesses, and sick leave will be approved, subject to the availability of the employee's credits.
26. Apart from initial health evaluations and other emergency health services (including counselling), normally available to employees through Health and Welfare Canada, professional medical and health services available through the welfare and health agencies of the community shall be utilized for subsequent and ongoing treatment.
27. Employees who cooperate in the counselling, referral and rehabilitative aspects of the Employee Assistance Program, and whose work performance returns to a satisfactory status, do so without prejudice to job security and promotional opportunities. However, employees shall be made aware that they are required to cooperate and comply with all instructions and requirements relative to a recovery program and, at the same time, demonstrate that job performance and work requirements can be maintained at a level and to a degree satisfactory to the supervisor concerned. Such employees shall not be afforded special privileges or exemptions in respect of required compliance with routine working regulations, safety standards, or any other performance requirements.

28. Any information related to an individual case which is made available to the manager, the program coordinator, the counsellor or others directly involved in the case must be maintained in a completely confidential status. Medical records shall be treated as medically confidential in accordance with the confidentiality requirements outlined in the Occupational Health Policy for the Public Service of Canada.
29. Employee representatives should become involved and participate fully in the ongoing administration, educational and promotional aspects of the program.

Implementation - Specific Program Requirements

30. An individual shall be appointed or designated by a Department or Agency as program administrator/coordinator, to direct or coordinate the overall operation of the departmental program.
31. Arrangements shall be made by departments for the provision or availability of trained personnel assistance counsellors on a full or part-time basis, as required. The activities of such personnel are not intended to replace the recognized role of Public Service Health personnel, including the Occupational Health Nurse.
32. Supervisors and managers shall be appropriately informed of their individual responsibility to identify employees demonstrating consistently poor or deteriorating work performance, and to effect referral of such individuals to a personnel assistance counsellor.
33. Arrangements shall be made by departments through training or other communicative methods to educate and inform supervisors/managers concerning
 - (1) the concepts and methods of early health problem recognition solely through the identification of poor or deteriorating job performance;
 - (2) the details and techniques of constructive confrontation of the alcoholic, including proper methods concerning the effective and authoritative use, or threat of use of action or sanctions leading to loss of job;
 - (3) the ongoing supervisory techniques of "support during recovery" that are concerned with helping the recovered alcoholic to maintain sobriety status.
34. Ongoing arrangements shall be made through the appropriate Regional Medical Services Branch office of Health and Welfare Canada for the provision of medical/health assessments and diagnosis, and other information relative to the health/medical aspects of rehabilitation.
35. Contacts should be established (in liaison with Health and Welfare where possible), with local community organizations or resources which are

concerned with information and education, advice, treatment and rehabilitation matters relative to the program.

36. Each department should plan and undertake a program of employee education and promotion among employees, of its employee assistance program. Such activities should incorporate an approach designed particularly to lessen the social stigma associated with alcoholism, and encourage affected employees to seek help voluntarily.

Evaluation

37. This annex and the resultant programs of selected departments will be subject to evaluation two years from the date of promulgation, based on the following criteria:
 - (1) The departmental Employee Assistance Program has been implemented and communicated to all required operational levels, is appropriate to the scope of its operations and complies with the general requirements and specific principles of this annex.
 - (2) The departmental program is identifying at an early stage, and providing for the rehabilitation of employees with personal health/behavioral problems.
 - (3) Supervisors and managers are informed and trained in the methods and techniques to be used in the identification, referral and the managerial role in the rehabilitation of their employees under the departmental Employee Assistance Program.
 - (4) Departmental managers are satisfied with the service provided to them by Health and Welfare Canada as outlined under Paragraph 19.

Evaluation - Data Required

38. To evaluate the extent to which some of the performance criteria have been met, data relative to a specified period will be supplied by departments to the Treasury Board upon request, as follows:
 - (1) A copy of the department's approved internal program directive.
 - (2) Confirmation of the appointment or assignment of a program administrator/coordinator, and an outline of the responsibilities and activities of that individual's position.
 - (3) The number of personnel assistance counsellors involved in the program, at headquarters and, where applicable, regionally.
 - (4) The number and type of training seminars, meetings or other occasions in which supervisors were instructed in the details of supervisory responsibilities associated with the administration of the program.

- (5) The number of employees referred voluntarily and involuntarily for counselling, and the number thereof recovered and returned to work.
- (6) The number of employees with suspected health/behavioral problems who have been evaluated by Health and Welfare Canada under this program, and the number of alcoholics diagnosed and referred to a rehabilitation program.
- (7) The number of employees whose employment has been terminated as a direct result of alcohol or due to alcohol-related problems or illnesses.

OCCUPATIONAL SAFETY POLICY

Introduction

1. Employment accidents adversely affect both the lives of employees and the efficiency of the enterprise. They cause injuries to personnel and damage to material and equipment, increase operating costs and interfere with operations and production, all of which negate the basic management objectives of an organization.
2. Accident prevention measures, appropriately designed and implemented as an integral part of the management system and work operations are, therefore, an important and essential element of efficient management. Effectively administered, such measures will minimize the incidence of work injuries, lower operating costs and contribute to the maximum utilization of human and material resources.
3. The provision of a safe working environment and the prevention of accidents are therefore matters of vital importance to both employer and employee. Accordingly, the purpose of this subchapter is to outline a policy on Occupational Safety in the Public Service and to provide guidelines within which departments should develop and implement safety programs.

Policy

Summary

4. The provision and maintenance of working conditions and procedures which are conducive to the health and safety of employees is a prime requisite in the operation of the Public Service of Canada, and, to this end, departments and agencies are responsible for implementing and maintaining safety programs appropriate to organizational, occupational and employee needs.

Application

5. This policy applies to all departments and other portions of the Public Service of Canada as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Objective

6. The objective of this policy is to achieve safe and healthful working conditions and procedures for all employees and to prevent or reduce the risk of employment injury.

Implementation

Responsibilities

7. The Treasury Board is responsible for the development, establishment and publication of Public Service occupational health and safety standards, guides and procedures, and for evaluating the effectiveness and general application of this policy.
8. Each Department and Agency is responsible for
 - (1) the establishment and maintenance of an internal policy and program designed, as a minimum, to prevent employment injury and assure the continuing safety of employees at work;
 - (2) ensuring that active involvement by employees or their representatives is maintained at appropriate levels within the organization in regard to the aims and the administration of the safety program.
9. In support of this policy and program, Labour Canada, through the services of Safety Officers designated under the Canada Labour Code (Part IV), has been delegated responsibility for carrying out periodic safety inspections and accident investigations throughout the Public Service and, where unsafe operations or working conditions are noted, for reporting and providing advice and direction to departments concerning corrective measures. In this regard, the disposition and implementation of such directives shall be governed by the procedures attached as Annex "A". It is also a function of Labour Canada to provide, upon request, technical advice and guidance in respect of accident prevention matters.

Guidelines

10. The key elements of an effective departmental safety program are active management leadership, provision of a safe working environment, effective training and supervision of personnel and an involved and cooperative work force.
11. As in any other area of departmental activity, the safety program must be systematically planned, developed and actively maintained. It should be initiated and directed by management, incorporate meaningful participation by employees, and be organized and administered so that the accident prevention activities are integrated with the organization's normal operations.
12. In implementing this policy, therefore, each department and agency is to establish and maintain an effective program of accident prevention activities as an integral part of its operations that will achieve safe and healthful working conditions for all employees. To this end, and without restricting departmental prerogatives, departments and agencies are

responsible for the organization and maintenance of a formal safety program appropriate to the work activities, environment and risks involved and which incorporates, as a minimum, relevant policies, standards, guides and procedures issued by the Treasury Board; such program to encompass the following:

- (1) the development and publication of a statement of internal safety policy which includes specific and overall safety responsibilities and objectives to guide the operation of the program;
- (2) the provision and maintenance of safe working conditions and procedures, supported by an effective system of safety inspection of all operating equipment and facilities in the department;
- (3) the implementation and enforcement, through appropriate lines of delegation and authority, of Treasury Board and other applicable safety/health standards, codes and procedures;
- (4) the provision of measures for ensuring that accidents occurring within the department's jurisdiction are investigated, reported and remedial action taken according to the procedures and requirements specified for the Public Service, and that the appropriate internal statistical records are maintained;
- (5) the provision of appropriate information, instruction, training, supervision and direction throughout the organization in regard to accident prevention methods and practices, and individual safety responsibilities and accountability;
- (6) the provision of measures for ensuring that the safety performance of each member of management respecting those areas under his/her supervision, is regularly evaluated relative to established safety objectives;
- (7) the establishment of a system to provide regularly scheduled audits or reviews of the safety activity and work injury experience of all organizational segments of the department;
- (8) the provision of appropriate emergency medical aid arrangements and/or facilities based on the first aid requirements specified for the Public Service;
- (9) the assignment of adequate safety personnel according to the size, complexity and operating risks of the department;
- (10) the establishment of Management-Employee Safety Committees at appropriate organizational levels to assist in the administration of the safety program;
- (11) the provision of directives for ensuring that Safety Officers designated by Labour Canada are afforded entry to all premises and facilities for purposes of inspection and accident investigation pursuant to paragraph 9.

Employee Involvement

13. Each employee has the responsibility to know and observe all relevant safety rules and procedures and to cooperate with the employer in achieving the objectives of the safety program.

Evaluation

14. This safety policy and supporting program will be evaluated by Treasury Board at periodic intervals for selected departments and agencies as determined and advised in advance by the Treasury Board Secretariat.

Performance Criteria

15. The evaluation of the effectiveness of this policy and its implementation will be based on the following performance criteria:
 - (1) this safety policy, together with relevant standards, guides and procedures issued by Treasury Board, are adopted and used as minimum requirements by departments and agencies to formulate and maintain their accident prevention policy and programs;
 - (2) departmental policy and supporting safety measures, standards, procedures and guides are communicated to and are being applied at all operational levels, are appropriate to departmental operations, and are achieving an acceptable level of safe and healthful working conditions for all employees;
 - (3) departmental management, supervisory staffs and employees are, according to need, receiving training and instruction in accident prevention practices and methods;
 - (4) safety performance is included as an appraisal factor in evaluating the overall performance of managers, where appropriate;
 - (5) Management-Employee Safety Committees and/or other joint-consultation arrangements are established and are appropriate to departmental operations;
 - (6) the departmental program is evaluated internally by management at regular intervals to establish the measure of program effectiveness and achievement, and to delineate matters requiring special attention.

Data and Information Required

16. To evaluate the extent to which the Performance Criteria have been met, the following departmental information and data will be required, and are to be supplied to the Treasury Board upon request:
 - (1) copies of current departmental safety organization charts, policy statements and major supporting directives, procedures, etc., issued in conjunction with the safety program and its associated activities and objectives;

- (2) copies of principal implementation directives issued at regional or district level in support of the departmental safety policy and program;
 - (3) data relative to the safety training and education (including first aid courses) of managers, supervisors and other employees, including the number and type of internal and external courses utilized, and the number of departmental participants;
 - (4) information respecting the provision and scope of formal Safety Committees, or other safety consultation arrangements;
 - (5) work injury data according to the minimum requirements specified in the Public Service Management Procedures Respecting the Investigation, Recording and Reporting of Work Accidents and Injuries;
 - (6) copies of departmental or other internal safety program evaluation reports, where available.
17. Other relevant information or employment injury data prepared for the Treasury Board Secretariat through arrangements with Labour Canada may also be considered in the evaluation.

Other Authorities

18. In implementing this policy, departments and agencies are reminded that certain other organizations, in addition to the Treasury Board, have a statutory responsibility for standards or regulations affecting the health and safety of persons employed in the Public Service. In this regard, the following, in particular, should be noted:
- (1) The Office of the Dominion Fire Commissioner has authority respecting matters of fire prevention and protection including the provision of fire prevention standards and procedures, for all property as defined in the Federal Government Property Fire Prevention Regulations.
 - (2) Safety Regulations made pursuant to the Atomic Energy Control Act shall, where applicable, take precedence over those issued by the Treasury Board.
 - (3) Transport Canada Safety Regulations made pursuant to the Canada Shipping Act shall, in the event of conflict with Treasury Board health and safety standards, take precedence over the latter.

PROCEDURES FOR IMPLEMENTING SAFETY
DIRECTIVES OF LABOUR CANADA
SAFETY OFFICERS

1. Safety Officers designated by Labour Canada are authorized by the Treasury Board to conduct safety inspections and investigations throughout the Public Service and, where unsafe operations or working conditions are noted, to report and provide direction to departments and agencies respecting corrective measures. The disposition of such reports and directives shall be governed by the following procedures and requirements.

General Procedures

2. The Safety Officer's reports and/or directives shall be provided to the responsible local departmental official in written form.
3. Departments and agencies shall comply with such directives as soon as possible after they are received, or within a time limit, if so specified.
4. The responsible departmental official shall notify the Regional Director of Labour Canada of the date of implementation of each separate directive, and also of the reasons for any undue delay in the implementation of a directive, including the interim action being taken. The Regional Director may, at his discretion, vary or rescind a directive.
5. Where a directive has not been complied with and, in the opinion of the Regional Director, no satisfactory explanation has been provided, Labour Canada may refer the matter to the Personnel Policy Branch of the Treasury Board Secretariat for such action as the latter deems necessary.
6. If a department or agency considers that compliance with a Safety Officer's directive is not practicable or feasible, the Labour Canada Regional Director should be consulted, and, if the matter is not resolved, the department or agency may appeal the directive to the Personnel Policy Branch of the Treasury Board Secretariat. Following review, the Treasury Board shall determine the disposition of the matter.

Procedures in the Case of Imminent Danger

7. Where, in the opinion of a Safety Officer, a situation poses imminent danger to the safety or health of an employee, the department may be directed to take immediate action to rectify or remove the hazard or imminent danger. If the imminent danger cannot otherwise be guarded or protected against immediately, the Safety Officer may also order the suspension of the use of the facilities or the operations related to the imminent danger until the condition has been rectified.

8. In such cases, the Safety Officer shall discuss the matter with the manager in charge of the operation and if immediate action cannot be taken to remove the danger to an extent satisfactory to the Safety Officer, and if, in his opinion, there is no other alternative, he will issue a written suspension order directed to the manager. Upon receipt of the suspension order, the manager shall take action to immediately discontinue the operation or use of the facility in question until the condition has been rectified in compliance with the Safety Officer's directive.
9. Where a suspension order has been issued, it shall be the responsibility of Labour Canada to immediately notify the Personnel Policy Branch of the Treasury Board Secretariat and the Deputy Head of the department or agency concerned of the suspension order.
10. If the department or agency considers that a suspension order is not warranted, it must comply with the order, but may request the Labour Canada Regional Director to review the matter, and if not resolved, may appeal to the Personnel Policy Branch of the Treasury Board Secretariat to have the order rescinded. Following review, the Treasury Board will determine the disposition of the matter.

II

S T A N D A R D S

II STANDARDS

Introduction

The health and safety Standards which follow in this Section have been established for application as an integral part of the work operations and activities throughout the Public Service of Canada. The detailed provisions contained in the Standards are designed to prevent employee accidents and injuries, and to protect employees against exposure to unhealthy environmental or occupational factors associated with their employment.

Departments and Agencies, through appropriate internal lines of delegation and authority, are responsible for the effective implementation and on-going application of these approved Standards. The Treasury Board also monitors their application through the survey and inspection services of Labour Canada and Health and Welfare Canada.

1. This Standard applies to all Public Service Departments and Agencies as defined in Part I of Schedule 1 of the Public Service Staff Relations Act.

Interpretation

2. In this Standard

- (1) "Act" means Part IV of the Canada Labour Code;
- (2) "approved" means approved by the Chief Inspector;
- (3) "boiler" means a vessel in which gas or vapour may be generated or in which gas, vapour or liquid may be put under pressure by heating and includes any pipe, fitting or other equipment attached to the vessel between the flanged, welded or screwed connections on the outlet side of the discharge valve thereof and the flanged welded or screwed connections on the inlet side of the supply valve thereof, or where there are no such valves, the corresponding points of the vessel;
- (4) "Canadian Standards Association Code" means the Code for the Construction and Inspection of Boilers and Pressure Vessels B-51, 1975, and amendments thereto;
- (5) "certificate of inspection" means a certificate issued by a Chief Inspector in respect of a boiler, pressure vessel or plant certifying that it has been inspected by a safety officer or some other person acceptable to the Chief Inspector and conforms to the minimum standards of the Canadian Standards Association Code;
- (6) "Certification of Qualification" means a certificate issued by the authority set out in Column II of Table II opposite the name of a province or territory listed in Column I of that Table certifying that the holder thereof has the necessary qualifications for the position for which the certificate is issued;
- (7) "Chief Inspector" means a person designated by the Minister as a Chief Inspector pursuant to paragraph 12;
- (8) "design" means the plans, patterns, drawings, and specifications of a proposed boiler, pressure vessel or plant;
- (9) "fitting" means a regulating, controlling or measuring device subject to internal pressure and attached to a boiler, pressure vessel or plant and includes a gauge cock, fusible plug, injector, pressure gauge, recording guage, safety valve, stop-and-check-valve, test cock, water gauge, water level controller and pipe fitting;

- (10) "major repairs" means repairs that may, in the opinion of the Chief Inspector, affect the strength of a boiler, pressure vessel or plant;
- (11) "maximum allowable pressure" means the maximum pressure, as shown on its certificate of inspection, at which a boiler, pressure vessel or plant is permitted to be operated;
- (12) "Minister" means the Minister of Labour;
- (13) "owner" means the Public Service Department or Agency responsible for the operation and/or maintenance of a boiler, pressure vessel or plant;
- (14) "plant" means a system of piping that contains a gas, vapour or liquid under pressure and includes any boiler or pressure connected thereto;
- (15) "pressure" means pressure in pounds per square inch (kilopascals) measured above prevailing atmospheric pressure;
- (16) "pressure vessel" means a vessel, other than a boiler, that is used for containing, storing, distributing, processing or otherwise handling any gas, vapour or liquid under pressure and includes any pipe, fitting or other equipment attached to the vessel between the flanged, welded or screwed connections on the outlet side of the discharge valve thereof and the flanged, welded or screwed connections on the inlet side of the supply valve thereof or, where there are no such valves, the corresponding points of the vessel;
- (17) "safety officer" means a person who is designated as a safety officer by the Minister pursuant to section 87 of the Act;
- (18) "seal" means to take any measures satisfactory to the Chief Inspector to prevent the unauthorized operation or use of a boiler, pressure vessel or plant;
- (19) "welder's card" means a card, certificate or other form issued by or acceptable to the Chief Inspector that attests to the acceptability of a welder's qualifications to weld in a province listed in Column I of Table II in accordance with the requirements of the provincial or territorial statute, as amended from time to time, set out in Column II of that Table;
- (20) "welding" means welding in connection with the fabrication, alteration or repair of a boiler, pressure vessel or plant.

Application

- 3. Subject to paragraph 4, this Standard applies to, or in respect of the design, construction, installation, operation and maintenance of all boilers, pressure vessels and plants operated in the Public Service of Canada.

4. This Standard does not apply to

- (1) a boiler that is used in connection with a hot liquid heating system that has no valves or other obstructions to prevent circulation between the boiler and an expansion tank that is vented freely to the atmosphere and providing that the boiler does not heat a volatile or toxic liquid and that it is not used in conjunction with other pressure vessels or equipment covered by this Standard;
- (2) a heating boiler, as defined in the Canadian Standards Association Code, that has a heating surface of 30 square feet (3 m²) or less;
- (3) a pressure vessel that has a capacity of 1½ cubic feet (40 l) or less;
- (4) a pressure vessel that is installed for use at a pressure of 15 pounds per square inch (100 kPa) or less;
- (5) a pressure vessel that has an internal diameter of 6 inches (150 mm) or less;
- (6) a pressure vessel that has an internal diameter of 24 inches (600 mm) or less and is used for the storage of hot water;
- (7) a pressure vessel that is used exclusively for hydraulic purposes at ambient temperatures;
- (8) a pressure vessel that has an internal diameter of 24 inches (600 mm) or less and is connected to a water pumping system containing air that is compressed to serve as a cushion; and
- (9) a refrigeration plant that has a capacity of five tons (1.5 GJ) or less of refrigeration in a twenty-four hour period.

Approval of Design

5. The owner shall ensure that where a boiler, pressure vessel or plant is being manufactured for use in the Public Service
- (1) the design and model of the boiler or pressure vessel and the design of the plant is approved in writing by a Chief Inspector;
 - (2) a Chief Inspector, or a person designated by him, is permitted to inspect the boiler, pressure vessel or plant at any time during its manufacture; and
 - (3) the manufacturer submits the design calculations of the boiler or pressure vessel when requested by a Chief Inspector.

Marking and Identification

6. The owner shall ensure that the provisions of the Canadian Standards Association Code are complied with in respect of the marking, identification, design and installation of any boiler, pressure vessel or plant used or to be used in the Public Service.

Inspection During Installation

7. A Chief Inspector may order the inspection of any boiler, pressure vessel or plant at any time during its installation.
8. When a Chief Inspector is satisfied that a boiler, pressure vessel or plant has been inspected and conforms to the standards of the Canadian Standards Association Code, he shall forthwith issue a certificate of inspection.
9. A Chief Inspector may, in writing, authorize the temporary use of a boiler, pressure vessel or plant in the Public Service pending an inspection, if he is satisfied it can be used safely.

Operation

10. No person shall operate or use, or permit to be operated or used, a boiler, pressure vessel or plant:
 - (1) unless a certificate of inspection has been issued in respect of that boiler, pressure vessel or plant, and
 - (2) unless every operator thereof is qualified in accordance with paragraph 11 (6) to operate the boiler, pressure vessel or plant;
 - (3) at a pressure higher than its maximum allowable pressure.
11. The owner shall ensure that
 - (1) every boiler, pressure vessel or plant has at least one safety valve or other approved equivalent fitting to relieve pressure at or below its maximum allowable pressure;
 - (2) where two or more boilers or pressure vessels are connected to each other in a plant for use at a common operating pressure, they are each fitted with one or more safety valves or other approved equivalent fittings to relieve pressure at or below the maximum allowable pressure of the weakest boiler or pressure vessel in the plant as shown on the certificate of inspection for that boiler or pressure vessel;
 - (3) no person alters, interferes with or renders inoperative any fitting attached to a boiler, pressure vessel or plant, except for the purpose of adjusting or testing the fitting, and on instructions from a Chief Inspector or a person designated by him;

- (4) no person causes or permits holes to be cut or drilled in a boiler or pressure vessel for any purpose unless that person has been authorized to do so in writing by a Chief Inspector, or instructed to do so as part of an inspection;
- (5) standards for control and supervision of the operation of boilers, pressure vessels and plants located in a province or territory listed in Column I of Table II are those standards established under the provincial statute or territorial ordinance as amended from time to time as set out in Column II of that Table opposite the name of the province or territory;
- (6) with the exception of the provisions of paragraph 11 (7) the qualifications required to be an operator of a boiler, pressure vessel or plant located in a province or territory listed in Column I of Table III, are those qualifications established under the Table opposite the name of that province or territory;
- (7) any person employed as an operator under the provision of the Public Service Employment Act who holds a valid certificate issued by any province or territory is (considered) qualified to operate a boiler, pressure vessel or plant in any province or territory, for which a certificate of the same kind and class is required; however, upon initial appointment under the provisions of the Public Service Employment Act, an operator must meet the actual statutory certification requirements of the province or territory in which the position to which he is appointed is located.

Inspections

12. The Minister shall designate safety officers as Chief Inspectors for boilers, pressure vessels and plants for specified geographical areas of Canada.
13. A Chief Inspector shall assign a safety officer or, where he considers it advisable, any other qualified person to inspect boilers, pressure vessels and plants in his geographical area.
14. Every boiler, pressure vessel and plant shall be inspected, by a person referred to in paragraph 13, at least once every twelve months unless the period is extended by a Chief Inspector.
15. A Chief Inspector may order that any boiler, pressure vessel or plant be inspected at any time.
16. The owner shall ensure that, during any inspection of a boiler, pressure vessel or plant, there is a person in attendance who is capable of taking all the necessary precautions to ensure the safety of the person making the inspection.

17. Where it is impracticable to carry out an inspection in accordance with this Standard before the expiry of a certificate of inspection, a Chief Inspector may extend the term of the certificate by notice in writing upon such terms and conditions as he may direct.
18. Where, at any time after a certificate of inspection has been issued, an inspection is made pursuant to this Standard and it is found that a boiler, pressure vessel or plant is defective, the Chief Inspector may issue directions prescribing the conditions and limits of safety under which the boiler, pressure vessel or plant may be operated until the defect is repaired.

Certificate of Inspection

19. A certificate of inspection shall show
 - (1) the date on which the inspection was made;
 - (2) the term for which the certificate is issued;
 - (3) the maximum allowable temperature or pressure at which the boiler, pressure vessel or plant may be used;
 - (4) the serial number and rated capacity of the boiler, pressure vessel or plant or such other identification as is acceptable to the Chief Inspector; and
 - (5) the location of the boiler, pressure vessel or plant.
20. Every certificate of inspection shall be posted near the boiler, pressure vessel or plant to which it applies or in such other place as the Chief Inspector may direct.
21. Where a Chief Inspector, or a person designated by him, inspects any boiler, pressure vessel or plant pursuant to paragraph 5, he may issue a certificate of inspection in respect of that boiler, pressure vessel or plant.
22. Subject to paragraph 23, where the design of a boiler, pressure vessel or plant has been approved by a Chief Inspector, but on inspection it is found that the boiler, pressure vessel or plant does not conform to that design, the Chief Inspector may issue a certificate of inspection for that boiler, pressure vessel or plant based on its design at the time of inspection.
23. The certificate of inspection referred to in paragraph 22 shall specify the maximum allowable temperature or pressure at which the boiler, pressure vessel or plant may be used, based on the maximum allowable temperature or pressure approved for boilers, pressure vessels or plants of the same design.

24. A Chief Inspector may issue a certificate of inspection in respect of a used boiler, pressure vessel or plant that is to be installed in his geographical area if he is satisfied that it has been inspected and conforms to the standards of the Canadian Standards Association Code.

Movement of a Boiler, Pressure Vessel or Plant

25. No person shall move or cause or permit to be moved a boiler, other than a portable boiler, or a boiler, pressure vessel or plant, the use of which has been prohibited pursuant to paragraph 28 unless authorized in writing by the Chief Inspector.

Repairs and Alterations

26. Where a safety officer finds, upon inspection of a boiler, pressure vessel or plant, any defect or condition that may render the boiler, pressure vessel or plant unsafe, he shall give directions in writing to the department or agency responsible, specifying the repairs that he considers necessary to ensure safe operation thereof and shall specify the period of time within which the repairs shall be made.
27. The owner shall ensure that
- (1) no person makes any major repairs to a boiler, pressure vessel or plant unless that person gives notice in writing to a Chief Inspector and receives written approval from that Chief Inspector to proceed with the repairs; and
 - (2) any boiler, pressure vessel or plant to which major repairs have been made is not used until the repairs have been inspected by a Chief Inspector and a new certificate of inspection has been issued.
28. Where a Chief Inspector or a safety officer finds, upon inspection of a boiler, pressure vessel or plant, a condition that, in his opinion, makes the operation of that boiler, pressure vessel or plant unsafe, he shall notify the responsible department or agency of the unsafe condition, and direct that the use of the boiler, pressure vessel or plant is prohibited; and also direct that the boiler, pressure vessel or plant is to be sealed in the manner he prescribes; and cancel the existing certificate of inspection.
29. Where an inspection has been made by a safety officer, other than a Chief Inspector, he shall notify the Chief Inspector of the directions given pursuant to paragraph 28 and of the action taken pursuant to that paragraph.
30. Where the use of a boiler, pressure vessel or plant has been prohibited pursuant to paragraph 28 but in the opinion of the Chief Inspector the boiler, pressure vessel or plant may be capable of being repaired, he shall give directions in writing to the responsible department or agency specifying the repairs and alterations that are required to return the boiler, pressure vessel or plant to a safe condition.

31. Where, pursuant to paragraph 30, directions have been given in respect of repairs and alterations to be made to a boiler, pressure vessel or plant, the responsible department or agency shall ensure that the boiler, pressure vessel or plant, is not used until the repairs and alterations have been inspected by the Chief Inspector and a certificate of inspection has been issued in respect of that boiler, pressure vessel or plant.
32. Where the use of a boiler, pressure vessel or plant has been prohibited pursuant to paragraph 28, and in the opinion of the Chief Inspector the boiler, pressure vessel or plant is not capable of being repaired or the responsible department or agency does not wish to have it repaired, the Chief Inspector shall give directions in writing specifying a method of disposal that will effectively prevent further use of the boiler, pressure vessel or plant in the Public Service.
33. The owner shall ensure that the appropriate Chief Inspector is notified in writing of the removal from operation of a boiler, pressure vessel or plant.
34. The appropriate Chief Inspector shall be notified immediately upon discovery of any condition in a boiler, pressure vessel or plant that may make the operation of the boiler, pressure vessel or plant unsafe.

Welding

35. The owner shall ensure that no welding is performed other than in a manner approved by the Chief Inspector, and that no person shall weld a boiler, pressure vessel or plant unless he possesses a welder's card.

Reporting of Accidents

36. A record shall be made of every accident or occurrence involving the use of a boiler, pressure vessel or plant that endangered the safety or health of any person, and that the record shall be available for review by a safety officer within seventy-two hours of the accident or dangerous occurrence.
37. An accident or occurrence referred to in paragraph 36 that results in a fatality or fire, or the rupture of a boiler, pressure vessel or plant, shall be reported immediately to the Chief Inspector.
38. No person shall disturb, destroy or alter any wreckage of a ruptured boiler, pressure vessel or plant unless permission to do so is given by a safety officer.
39. Notwithstanding paragraph 38, the wreckage of a ruptured boiler, pressure vessel or plant may be moved to the extent necessary to allow the safe removal of any person who has been injured in the accident or dangerous occurrence that caused the rupture.

General

40. Where a power is conferred by this Standard on a Chief Inspector or any other safety officer, that power may be exercised by a safety officer holding the appointment (or equivalent position) of Chief, Accident Prevention Division, Occupational Safety and Health Branch, Labour Canada.
41. The safety officer holding the appointment referred to in paragraph 40 may vary, rescind or confirm any order or direction made by a Chief Inspector or any other safety officer pursuant to this Standard.

TABLE 1
PROVINCIAL AND TERRITORIAL CERTIFYING AUTHORITIES

<u>Column I</u>	<u>Column II</u>
1. Alberta	The Minister of Manpower and Labour
2. British Columbia	The Minister of Public Works of British Columbia
3. Manitoba	The Minister of Labour of Manitoba
4. New Brunswick	The Board of Examiners established by section 6 of the Stationary Engineers Act, Chapter 22, Statutes of New Brunswick, 1967
5. Newfoundland	The Minister of Manpower and Industrial Relations of Newfoundland
6. Northwest Territories	Director of Public Services
7. Nova Scotia	The Minister of Labour of Nova Scotia
8. Ontario	Minister of Consumer and Commercial Relations
9. Prince Edward Island	Minister of Labour
10. Quebec	The Board of Examiners established by section 6 of the Stationary Enginemen Act being chapter 157 of the Revised Statutes of Quebec, 1964
11. Saskatchewan	The Department of Labour of Saskatchewan
12. Yukon Territory	Territorial Secretary, Yukon Territory

TABLE II

PROVINCIAL AND TERRITORIAL BOILER AND PRESSURE VESSEL
STATUTES AND ORDINANCES

<u>Column I</u>	<u>Column II</u>
1. Alberta	The Boilers and Pressure Vessels Act, Revised Statutes of Alberta 1970, Chapter 32
2. British Columbia	Boiler and Pressure Vessel Act, Revised Statutes of British Columbia, 1960, Chapter 32
3. Manitoba	The Steam and Pressure Plants Act, Revised Statutes of Manitoba, 1970, Chapter S 210
4. New Brunswick	Boiler and Pressure Vessel Act, Revised Statutes of New Brunswick, 1973, Chapter B-7
5. Newfoundland	The Boiler and Pressure Vessel Act, Revised Statutes of Newfoundland 1970, Chapter 24
6. Northwest Territories	Boilers and Pressure Vessels Ordinance, Ordinances of the Northwest Territories, 1970 (1st session) Chapter 1
7. Nova Scotia	Steam Boiler and Pressure Vessel Act, Revised Statutes of Nova Scotia, 1967, Chapter 291
8. Ontario	The Boilers and Pressure Vessels Act, Revised Statutes of Ontario 1970, Chapter 47.
9. Prince Edward Island	The Steam Boiler Act, Revised Statutes of Prince Edward Island, 1951, Chapter 151
10. Quebec	Pressure Vessel Act, Revised Statutes of Quebec, 1964, Chapter 156
11. Saskatchewan	The Boiler and Pressure Vessel Act, Revised Statutes of Saskatchewan 1965, Chapter 371
12. Yukon Territory	Steam Boilers Ordinance, Revised Ordinances of the Yukon Territory, 1971, Chapter S-8

TABLE III

PROVINCIAL AND TERRITORIAL BOILER AND PRESSURE VESSEL
OPERATOR STATUTES AND ORDINANCES

<u>Column I</u>	<u>Column II</u>
1. Alberta	The Boilers and Pressure Vessels Act, Revised Statutes of Alberta 1970, Chapter 32
2. British Columbia	Boiler and Pressure Vessel Act, Revised Statutes of British Columbia, 1960, Chapter 32
3. Manitoba	The Operating Engineers and Firemen Act, Revised Statutes of Manitoba 1970, Chapter 0-50
4. New Brunswick	Stationary Engineers Act, Statutes of New Brunswick 1967, Chapter 22
5. Newfoundland	The Boiler and Pressure Vessel Act, Revised Statutes of Newfoundland 1970, Chapter 24
6. Northwest Territories	Boilers and Pressure Vessels Ordinance, 1970, (1st Session), Chapter 1
7. Nova Scotia	Engine Operators Act, Revised Statutes of Nova Scotia, 1967, Chapter 89
8. Ontario	Operating Engineers Act, Revised Statutes of Ontario, 1970, Chapter 333
9. Prince Edward Island	Power Engineers Act, Statutes of Prince Edward Island 1972, Chapter 37
10. Quebec	Stationary Enginemmen Act, Revised Statutes of Quebec, 1964, Chapter 157, (Repealed)
11. Saskatchewan	Boiler and Pressure Vessel Act, Revised Statutes of Saskatchewan 1965, Chapter 371
12. Yukon Territory	Steam Boilers Ordinance, Revised Ordinances of the Yukon Territory 1971, Chapter S-8

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule 1 of the Public Service Staff Relations Act.
2. This Standard does not apply in respect of the transportation of dangerous substances over a public highway.
3. Regulations, including those concerning the use of radioactive substances, which are issued pursuant to the Atomic Energy Control Act, shall where applicable, take precedence over the provisions of this Standard.
4. Requirements to safeguard the fire and explosion hazards of "dangerous substances" are the responsibility of the Dominion Fire Commissioner and are covered in Standards and Requirements issued by his Office under the authority of the Government Property Fire Prevention Regulations.

Definitions

5. In this Standard
 - (1) "dangerous substance" means any substance that, because of a property it possesses, is dangerous to the safety or health of any person who is exposed to it;
 - (2) "piping system" means an assembly of pipe, pipe fittings and valves, together with any pumps, compressors and other fixed equipment to which it is connected, that is used for transferring a dangerous liquid or gaseous substance from one location to another;
 - (3) "qualified person" means a person who, because of his knowledge, training and experience, is qualified to perform safely and properly a specified job;
 - (4) "radiation emitting device" means any device that is capable of producing and emitting energy in the form of
 - (a) electromagnetic waves having frequencies greater than ten megacycles per second (ten megahertz); and
 - (b) ultrasonic waves having frequencies greater than ten kilocycles per second (ten kilohertz);
 - (5) "restricted area" means an area where explosives, flammable liquids, or flammable gases are stored, handled or processed or where the atmosphere contains or is likely to contain explosive concentrations of combustible dust or other combustible suspended material;

- (6) "safety officer" means a person designated by the Minister of Labour pursuant to Part IV of the Canada Labour Code; and
- (7) "environmental health officer" means a person so designated by Health and Welfare Canada.

Substitution of Non-Dangerous Substances

- 6. A dangerous substance or radiation emitting device shall not be used if it is reasonably practicable to use a substance or device that is not dangerous.
- 7. Where it is necessary to use a dangerous substance or a radiation emitting device and more than one kind of such substance or device is available, the one that is least dangerous is to be used, to the extent that it is reasonably practicable.

Isolation and Confinement

- 8. Where operations involve the use of a dangerous substance or a radiation emitting device in any area, the use of that substance or device and any hazard resulting from that use are to be confined within that area, to the extent that is reasonably practicable.
- 9. Where operations require the storing of dangerous substances in any area, they are to be stored, to the extent that is reasonably practicable, in a manner that will prevent the transmission of the effect of an explosion, fire or other accident in that area to any adjacent area.
- 10. A dangerous substance shall not be stored near another substance if the potential danger of the dangerous substance is likely to be increased thereby.
- 11. To the extent that is reasonably practicable, the quantity of a dangerous substance in any area where it is being used, processed or manufactured should not exceed
 - (1) the quantity that is consistent with good industrial safety practice, or
 - (2) the amount required for that area for one work day, whichever is the lesser.

Control of Airborne Contaminants

- 12. Any dangerous substance that may be carried by the air is to be confined as closely as is reasonably practicable to its source.
- 13. Subject to paragraph 14, each department shall ensure that the concentration of any dangerous substance that may be carried by the air in any area where an employee is working

- (1) does not exceed the threshold limit value recommended by the American Conference of Governmental Industrial Hygienists in its pamphlet "Threshold Limit Values for Air Borne Contaminants 1976", as amended from time to time; or
 - (2) conforms with any standard that follows good industrial safety practice, and is recommended by Labour Canada or Health and Welfare Canada.
14. Except in respect of any dangerous substance that is assigned a Ceiling "C" value by the American Conference of Governmental Industrial Hygienists, it is permissible for the concentration of a dangerous substance that may be carried by the air in the area where an employee is working to exceed the threshold limit value described in paragraph 13 for a period of time calculated according to a formula that
- (1) is prescribed by the American Conference of Governmental Industrial Hygienists or;
 - (2) is recommended by Labour Canada or Health and Welfare Canada.
15. Where the atmosphere of any area in which an employee is working is subject to contamination by a dangerous substance, the atmosphere is to be sampled and tested by a qualified person as frequently
- (1) as may be necessary to ensure that the level of contamination does not at any time exceed the safe limits prescribed by paragraphs 13 and 14; or
 - (2) as may be recommended by Labour Canada or Health and Welfare Canada.
16. The sampling and testing referred to in paragraph 15 shall comply with
- (1) a method recommended by the American Conference of Governmental Industrial Hygienists, the American Society for Testing and Materials, the Dominion Fire Commissioner; or
 - (2) any other sampling and testing method that follows good industrial safety practice, and is recommended by Labour Canada, Health and Welfare Canada or the Dominion Fire Commissioner.
17. A record of each test made pursuant to paragraph 15 shall be retained for at least three years.
18. Every record referred to in paragraph 17 shall
- (1) be signed by the person who carried out the test;
 - (2) be available at all reasonable times for examination by a safety officer or an environmental health officer; and

(3) include the following data:

- (a) the date, time and location of the test;
- (b) the number of persons normally occupying the area tested;
- (c) the dangerous substance for which the test was made;
- (d) the type of testing equipment used;
- (e) the result obtained; and
- (f) the name and occupation of the persons who made the test.

Personal Protective Equipment

19. Where it is not reasonably practicable to prevent harmful exposure to a dangerous substance or radiation emitting device, personal protective equipment that will reduce such exposure to a safe level shall be worn and used.

Warning and Training of Employees

20. Each employee whose safety or health may be endangered by exposure to a dangerous substance or radiation emitting device is to be informed of the danger.
21. An employee shall not use or handle, or be permitted to use or handle, a dangerous substance or radiation emitting device where such use or handling would expose the employee to danger unless the employee has been instructed and trained
- (1) in the proper method to follow in order to minimize and control the danger; and
 - (2) in the emergency procedures to follow in the event of an accident involving that substance or device.
22. The method referred to in paragraph 21 shall
- (1) be set out in writing;
 - (2) follow good industrial safety practice; and
 - (3) be readily available for examination by any employee to whom it applies, and a safety officer or an environmental health officer.
23. A record of any training provided to employees relating to paragraph 21 should be retained for at least three years and be available for examination at all reasonable times.

Signs

24. Where a dangerous substance or radiation emitting device is handled, stored or used in any area in any manner that is dangerous to the safety or health of an employee who might be in that area, signs are to be posted to warn persons entering the area of that danger.

Containers

25. Departments shall ensure that
- (1) every portable container for a dangerous substance that is used on its premises complies with a portable container specification prescribed for that dangerous substance in the Canadian Transport Commission Regulations for the Transportation of Dangerous Commodities by Rail, or with a portable container specification recommended by Labour Canada or Health and Welfare Canada;
 - (2) every stationary storage container for a dangerous substance that is used on its premises complies with a stationary storage container specification prescribed for that dangerous substance pursuant to a law of the province or territory in which the container is located, or with a stationary storage container specification recommended by Labour Canada or Health and Welfare Canada;
 - (3) every container for a radiation emitting device that is used on its premises complies with a container specification prescribed for that radiation emitting device by the Radiation Protection Bureau of Health and Welfare Canada.
26. Every container of a dangerous substance that is used is, with respect to its contents, to be labelled, marked or tagged in accordance with
- (1) the Canadian Transport Commission Regulations for the Transportation of Dangerous Commodities by Rail;
 - (2) The Manufacturing Chemists Association Guide to Precautionary Labelling of Hazardous Chemicals;
 - (3) the requirements of the Hazardous Products (Hazardous Substances) Regulations of Canada, or any other labelling standard that identifies the dangerous substance in the container by its common name, and lists the principal danger or dangers of that substance.

Ventilation

27. Where there are a number of substances in the air in different areas of a work place, a combination of which might cause a hazard, the air is to be exhausted from those areas in such a manner that the various substances are not combined.

28. Exhaust and inlet ducts for ventilation systems are to be located and arranged so as to ensure that air contaminated with dangerous substances does not enter areas occupied by employees.

Housekeeping

29. Departments shall ensure that

- (1) premises and equipment are, to the extent that is reasonably practicable, designed, constructed and maintained in a manner that will
 - (a) prevent the dust and waste from dangerous substances from accumulating in dangerous quantities, and
 - (b) facilitate the easy removal of the dust and waste referred to in paragraph 29 (1) (a);
- (2) all dust, waste material and any spill of a dangerous substance is:
 - (a) removed from its premises in such a manner and as frequently as will ensure a safe and healthful environment for employees and
 - (b) disposed of in a manner that does not endanger the health and safety of any employee.

Emergency Equipment

30. To the extent that is reasonably practicable, the following shall be provided:
- (1) emergency shower and eye washing equipment, where there is a danger of skin or eye injury from corrosive substances;
 - (2) a fire blanket and a suitable portable fire extinguisher, where there is a danger of fire due to the presence of flammable liquids or gases, and meeting the requirements of the Dominion Fire Commissioner;
 - (3) rescue equipment, where there is a danger that a toxic substance may be released into, or an oxygen deficient atmosphere created in, an area that would render any employee incapable of escaping without assistance;
 - (4) warning and detection systems where the seriousness of any danger so requires; and
 - (5) such other emergency equipment as may be necessary to ensure a standard of protection that is consistent with good industrial safety practice.

31. All equipment described in paragraph 30 shall be of a type and quantity that

- (1) is recommended by the Canadian Standards Association, the American National Standards Institute or the Dominion Fire Commissioner; or
- (2) conforms with any other standard that is recommended by Labour Canada, Health and Welfare Canada, or the Dominion Fire Commissioner.

Combustible Dusts

32. Combustible dust collectors are to be designed, installed, operated and maintained in accordance with the requirements of the Dominion Fire Commissioner.

33. The exterior surface temperature of pipes or ducts exposed to combustible dusts and insulation used on those pipes or ducts shall comply with the requirements of the Dominion Fire Commissioner.

Restricted Areas

34. Measures and precautions concerning smoking, or any procedure or equipment the use of which in a restricted area may cause ignition or explosion of a dangerous substance, shall be in compliance with the requirements of the Dominion Fire Commissioner.

Compressed Air

35. An employee shall not use or be permitted to use compressed air for cleaning or any other purpose

- (1) where that use will result in a concentration of a dangerous substance in the atmosphere that is in excess of the prescribed safe limits referred to in paragraphs 13 and 14; or
- (2) in such a manner that the air is directed forcibly against the body of the employee or any other person.

36. To the extent that is reasonably practicable, compressed air shall be used only with ventilated hoods or booths, or in areas where employees are protected fully from any dangerous substance or flying particles.

General Design of Work Places

37. To the extent that is reasonably practicable, the design and construction of every place in which a dangerous substance is manufactured, handled, stored, processed or used, shall be such that

- (1) in an emergency, employees may be quickly evacuated;
 - (2) where an accident is likely to result in a spill or leak of a dangerous substance or in a fire, the effect of such a spill, leak or fire on the safety and health of any employee is minimized;
 - (3) where a dangerous substance may explode, pressure resulting from any such explosion will be relieved in a manner that will prevent the explosive pressure from exceeding one pound per square inch (seven kilopascals).
38. Paragraph 37 does not apply to the handling, storing or using of a dangerous substance in a vehicle.

Piping Systems

39. Every piping system is to be
- (1) adequate for its intended purpose, having regard to the corrosiveness, pressure, temperature and other properties of the dangerous substance that is being conveyed; and
 - (2) fitted with valves and other control and safety devices sufficient to ensure the safe operation, repair and maintenance of the system.
40. Every valve and other control or safety device that is essential to the safe operation, repair or maintenance of a piping system is to be marked, tagged or otherwise identified by a system that follows good industrial safety practice and will assist in the safe use of that valve or other control or safety device.
41. Every person who operates, maintains or repairs a piping system or any part thereof is to be aware of the location of every valve and other control or safety device connected with that system and is to be trained in its proper and safe use.

Radiation Devices

42. Every radiation emitting device to which any employee is exposed is to be
- (1) registered with the Radiation Protection Bureau, Health and Welfare Canada; and
 - (2) designed, constructed, installed, maintained and used in accordance with a standard that is acceptable to the Radiation Protection Bureau.

Electrical Safety

43. Where dangerous substances are present in hazardous quantities in a location, all electrical facilities used in that location shall comply with

- (1) the Canadian Standards Association Canadian Electrical Code Standard C22.1-1975, as amended from time to time; or
- (2) any other safety standard that conforms with good industrial safety practice and is recommended by Labour Canada.

44. Where there is a danger of ignition or explosion of a dangerous substance due to static electricity, such hazard shall be controlled in accordance with the requirements of the Dominion Fire Commissioner.

Explosives

45. An employee shall not use, or be permitted to use dynamite, blasting caps or other explosive used in blasting unless he has in his possession a blaster's certificate that is issued
- (1) under the authority of a provincial, territorial or municipal authority; or
 - (2) by a qualified person recommended by the Regional Director of Labour Canada.
46. Where explosives are being used in an area that has been designated by a person in charge as a danger area, no unauthorized person, except a safety officer, shall enter that area.
47. Warning signs or guards shall be placed at the main entrances to any areas referred to in paragraph 46 to warn persons of the danger in that area.

Medical Examinations

48. Medical examinations for employees exposed to dangerous substances shall be administered as required in accordance with the Periodic Health Evaluation Standard, TB STD 3-13.
49. Where recommended by Health and Welfare Canada, appropriate records are to be maintained in respect to an employee's exposure to dangerous substances which may have an accumulative effect on the health of the employee.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard

- (1) "ampacity" means current carrying capacity expressed in amperes;
- (2) "Canadian Electrical Code" means the code of electrical facility standards published by the Canadian Standards Association as amended from time to time;
- (3) "conductor" means a wire, cable or other form of metal installed for the sole purpose of conveying electrical current from one piece of electrical equipment to another or to ground;
- (4) "control device" means a device which will safely disconnect or connect an electrical facility to or from its sources of energy;
- (5) "electrical facility" means any equipment, device, apparatus, wiring, conductor, assembly or part thereof that is employed for the generation, transformation, transmission, distribution, storage, control, measurement or utilization of electrical energy and that has an ampacity and voltage that is dangerous to employees;
- (6) "guarantee of isolation" means in respect of an electrical facility, that it is isolated;
- (7) "guarded" means, in respect to an electrical facility, that the facility is covered, shielded, fenced, enclosed or inaccessible by location or otherwise protected in a manner that will prevent or reduce, to the extent that this is reasonably practicable, danger to any person who might touch or go near that facility;
- (8) "high voltage" means a voltage of seven hundred and fifty-one volts or more between any two conductors or between any conductor and ground;
- (9) "insulated" means, in respect of an electrical conductor, that the surface of the conductor is separated from every other surface that will conduct electricity by a dielectric substance or air space that will resist, to the extent sufficient for the condition of use of the conductor, the passage of electric current and electrical discharge in an abnormal or disruptive manner through the substance or space;

- (10) "isolated" means, in respect of an electrical facility, that the facility is separated or disconnected from every source of electrical, mechanical, hydraulic, pneumatic or other kind of energy that is capable of making the facility dangerous;
- (11) "live" means, in respect of an electrical facility, that the electrical facility
 - (a) produces, contains, stores or is electrically connected to a source of alternating or direct current, or
 - (b) contains any hydraulic, mechanical, pneumatic or other kind of energy.
- (12) "person in charge" means a qualified person appointed to ensure the safe and proper conduct of an operation or of the work of employees;
- (13) "qualified person" means a person who, because of knowledge, training and experience, is qualified to perform safely and properly a specified job;
- (14) "safety officer" or "regional safety officer" means a person so designated by the Minister of Labour pursuant to Part IV of the Canada Labour Code;
- (15) "safety ground" or "safety grounding" means a system of conductors, electrodes and clamps, connections or devices that electrically connect an isolated electrical facility to ground for the purpose of protecting employees working on the facility from dangerous electrical shock;
- (16) "voltage", in respect of an alternating electric circuit, means greatest root-mean-square voltage between any two conductors of the circuit or between any conductor of the circuit and ground, and in respect to a direct current electric circuit means the greatest voltage between any two conductors of the circuit or between any conductor of the circuit and ground;
- (17) "permitted" means that, with respect to the actions of an employee, the department, through the person in charge, shall ensure that the necessary supervisory control is exercised.

Design, Construction, Installation, Operation,
Use, Repair, Maintenance and Alteration

- 3. Every electrical facility is to be operated, used, repaired or maintained in accordance with the requirements of
 - (1) the Canadian Electrical Code or any other standard of good electrical safety practice that is acceptable to Labour Canada; and

- (2) the Dominion Fire Commissioner, in respect to matters related to fire safety.
4. Initial inspection and approval of electrical facilities in new projects and/or major alterations to existing facilities including the installation or relocation of equipment, and the location and siting of work areas should, where practicable, be submitted to the appropriate municipal or provincial agency for review and comment prior to the commencement of such work.

General Precautions

5. No employee shall be permitted to install, modify, adjust, test, operate, repair or do any other similar work on an electrical facility, and no employee shall do any such work, unless the employee is a qualified person or
 - (1) has been instructed and trained in
 - (a) the safe use of the tools and equipment required to do the work, and
 - (b) the safety precautions necessary to avoid injury to himself and other employees and
 - (2) does such work under the direct supervision of a qualified person.
6. Where an electrical facility is not live but is capable of becoming live, no employee shall work on or be permitted to work on that facility unless
 - (1) the employee follows procedures that are safe for work on live conductors; or
 - (2) a safety ground is properly connected to that facility.
7. Where any employee is working on or near an electrical facility that is live, or is capable of becoming live, the person in charge shall ensure that the electrical facility is guarded, or that other measures acceptable to a safety officer are taken to protect the employee from injury.
8. Departments shall maintain in a conspicuous place at every approach to any area that may, because of its proximity to a live high voltage electrical facility, in the opinion of a responsible departmental official be dangerous to employees,
 - (1) a legible sign with the words "Danger - High Voltage" and "Danger - Haute Tension" or a similar warning in letters that are, wherever possible, not less than two inches (50 mm) in height on a contrasting background; or
 - (2) an approved warning symbol conveying the same meaning.

Consent to Work on a High Voltage Electrical Facility

9. No employee shall commence or be permitted to commence work on any high voltage electrical facility except with the consent of the person in charge of that facility.
10. No employee shall enter or be permitted to enter part of an electrical vault or station in which a live high voltage electrical facility is installed except with the consent of the person in charge of that vault or station.
11. Subject to paragraph 12, no employee shall operate, or be permitted to operate, a switch that makes a high voltage electrical facility live, except with consent of the person in charge of that switch.
12. An employee may open a switch referred to in paragraph 11 without the consent of the person in charge of that switch where, in the opinion of that employee, the opening of the switch is necessary to prevent loss of life or serious damage to property or equipment.

Safety Watcher

13. Subject to paragraph 15, every person in charge of any employee working on or near a live electrical facility shall, where because of the nature of the work or the condition or location of the work site it is necessary for the safety of the employee that the work be observed by a person not engaged in the work, appoint a safety watcher to warn all employees on the work site of danger and to ensure compliance with the safety precautions and procedures prescribed for that work.
14. Each person appointed pursuant to paragraph 13 or acting pursuant to paragraph 15 as a safety watcher in connection with any work is to be
 - (1) a qualified person;
 - (2) informed of the dangers involved in the work that he is watching;
 - (3) trained and instructed in the procedure to follow in an emergency;
 - (4) clearly identified as a safety watcher;
 - (5) authorized to stop immediately any part of the work that he considers dangerous; and
 - (6) free of any other duties that might interfere with his duties as a safety watcher.
15. Where a person in charge of an employee is required by paragraph 13 to appoint a safety watcher, he may, instead of appointing a safety watcher, act as a safety watcher himself if he complies with the requirements of paragraph 14.

Coordination of Work

16. Where any employee is working on, or in connection with, an electrical facility, such employee and every other person who is so working, including every safety watcher, shall be fully informed by the person in charge with respect to the safe coordination of their work.

Special Tools and Equipment

17. No employee shall work or be permitted to work on a live electrical facility the voltage of which, between any two conductors, is in excess of five thousand two hundred volts or, between any conductor and ground, is in excess of three thousand volts, unless that employee is
 - (1) provided with such special insulated tools and equipment as are necessary in accordance with good electrical safety practice for the safe performance of the work; and
 - (2) trained and instructed in the safe use of such tools and equipment.
18. Where, in the opinion of a Labour Canada Regional Director, such instructions are necessary for the safe performance of the work referred to in paragraph 17
 - (1) written instructions, acceptable to the Regional Director, shall be prepared for the use of each employee who is engaged in that work; and
 - (2) a copy of the written instructions shall be readily available for examination by any employee required to work in accordance therewith, and by any safety officer.

Protective Clothing and Equipment

19. No employee shall work or be permitted to work on an electrical facility
 - (1) that has not more than two hundred and fifty volts between any two conductors, or between any conductor and ground where there is a possibility of a dangerous electrical shock, or
 - (2) that has more than two hundred and fifty volts but not more than five thousand two hundred volts between any two conductors, or not more than three thousand volts between any conductor and ground,unless that employee uses such insulated protective clothing and equipment as is necessary, in accordance with good electrical safety practice or as recommended by a safety officer, to protect him from injury during the performance of the work.
20. No employee shall work or be permitted to work on an electrical facility that, in accordance with good electrical safety practice, requires

protective headwear to be worn unless he is wearing protective headwear that complies with the Class B requirements of the Canadian Standards Association standard Z94.1-1966 "Industrial Protective Headwear", as amended from time to time.

21. Unless otherwise recommended in writing by a safety officer, no employee shall work or be permitted to work on or near a live high voltage electrical facility unless he is wearing outer clothing that
 - (1) is fabricated from tightly woven natural wool or some other material that is equally resistant to ignition; and
 - (2) has full length sleeves fastened at the wrists.
22. No employee shall operate or be permitted to operate any unguarded electrical switch or other device, the operation of which may result in an electrical flash, flying molten metal or any other danger to the eyes of the employee unless the employee is wearing safety glasses or wearing or using some other eye protection equipment, and the glasses or equipment, as the case may be, complies with the Canadian Standards Association standard Z94.3-1969 "Eye Protectors" as amended from time to time, or with a standard acceptable to Labour Canada.

Testing of Insulated Clothing, Equipment and Tools

23. Every article of insulated protective clothing, every piece of insulated equipment and every insulated device and tool referred to in this Standard is to be
 - (1) so designed, constructed and maintained as to be safe, adequate and reliable under all conditions of intended use; and
 - (2) tested by a qualified person before initial use, and thereafter as frequently as is necessary to ensure that it retains its integrity.
24. Each time an article of protective clothing, a piece of insulated equipment or an insulated device or tool passes the test referred to in paragraph 23 (2) it shall be clearly marked to show the date of the test.
25. Any protective clothing, equipment, device or tool that fails the test referred to in paragraph 23 (2) is to be
 - (1) immediately removed from the service for which it was designed and tested; and
 - (2) so marked or tagged as to prevent its use in that service until it has been restored to such a condition that it will not fail the test.
26. The test referred to in paragraph 23 (2) shall be made in accordance with a procedure that complies with the Canadian Standards Association

standard C104.3-1966 as amended from time to time (insofar as Rubber Insulating Gloves and Mitts are concerned), or a standard acceptable to Labour Canada.

27. No employee shall use or be permitted to use any protective clothing, equipment, device or tool, unless each time it is used it is visually inspected by the employee prior to that use to ensure that, within the limits of such inspection, it is safe for such use.

Poles and Elevated Structures

28. No employee shall climb or be permitted to climb any pole or elevated structure used to support an electrical facility until the employee has examined and tested that pole or structure and determined, to the extent that is reasonably practicable from such examination and testing, that the pole or structure is safe for climbing.
29. Where, as a result of any examination or test of a pole or elevated structure referred to in paragraph 28, it appears that the pole or structure will be safe for climbing only with temporary supports, such supports shall be installed, and pike-poles alone shall not be used for such supports.
30. No employee shall work or be permitted to work on any pole or elevated structure referred to in paragraph 28 unless he is qualified, and is properly equipped for such work, and he has been instructed and trained in the rescue of persons who may be injured in such work.
31. Every pole or elevated structure referred to in paragraph 28 that is made of wood and is embedded in the ground shall bear a permanent and visible mark, the location of which is at a point above ground that is
 - (1) ten feet (3.0 m) from the end that is embedded in the ground; or
 - (2) more than ten feet (3.0 m) from the end that is embedded in the ground if the distance of the mark in feet (metres) from the embedded end is clearly and permanently imprinted at or near the mark.
32. No employee shall climb or be permitted to climb or work from a pole or structure referred to in paragraph 31 that is located so near another structure or object, or has affixed to it any thing that is not part of the electrical facility, which interferes with the safe climbing of the pole or structure or the safe conduct of work therefrom.

Working Distance from Live Conductors

33. Subject to paragraph 34, no employee shall work or be permitted to work so close to any live, unguarded or uninsulated electrical line or other conductor (the operating voltage of which is within a voltage range described in column I of an item of Table I), that the distance from

- (1) any part of the body of the employee, or
 - (2) any part of any thing with which he is in contact and that is normally capable of conducting electricity to the conductor is less than
 - (a) the distance set out in column II of that item, where the employee is not a qualified person
 - (b) the distance set out in column III of that item, where the employee is a qualified person, or
 - (c) the distance set out in column IV of that item, where an employee is a qualified person and is following a procedure referred to in paragraph 34.
34. Where an employee referred to in paragraph 33 (1) or 33 (2) is working near a conductor described in paragraph 33, and it is not reasonably practicable for such employee to properly perform his work at a distance that complies with that paragraph, he may work at such lesser distance as is acceptable to a Labour Canada Regional Director if he follows a special procedure that conforms to good electrical safety practice that is acceptable to the Labour Canada Regional Director.
35. Every person in charge of an employee who, in order to comply with this paragraph, is required to follow a special procedure referred to in paragraph 34 shall ensure that written instructions in respect of any such procedure are prepared, and are
- (1) signed and dated by the person in charge;
 - (2) readily available for examination by any employee who is required to work on the electrical facility, any person who is authorized to enter the work area, and any safety officer; and
 - (3) retained on file for at least one year following the completion of the work.
36. No employee shall work or be permitted to work near a conductor described in paragraph 33 where there is danger that, if the employee stumbled, fell, or unintentionally moved, the distance from any part of his body, or any part of any thing with which he is in contact and that is normally capable of conducting electricity, to the conductor would be less than that required by paragraph 33.

Instructions Relating to the Isolation of Electrical Facilities

37. Before an electrical facility is isolated to permit work of live tests to be performed thereon, or its isolation is changed or terminated, every person in charge who has issued oral instructions in respect of the operation of a control device that affects the isolation of that facility shall

- (1) designate the device to which the instructions apply;
 - (2) where applicable, prescribe the correct sequence of operation;
 - (3) require that the instructions be repeated word for word or otherwise assure himself that the instructions are understood; and
 - (4) make and sign a record in writing, which record shall state
 - (a) the day and hour when the instructions were issued and, to the extent that is reasonably practicable, the day and hour of the commencement and of the termination of the period during which the instructions are to remain in force; and
 - (b) the name of the person to whom the instructions were issued.
38. Every record required to be made pursuant to paragraph 37 (4) shall be readily available to the persons concerned while the instructions are in force and thereafter be retained by the department for at least one year and be readily available for examination by a safety officer.

Isolation of Electrical Facilities

39. Subject to paragraph 42, the department in charge of work on, or of any live test of, an isolated electrical facility, shall ensure that
- (1) no such work or test is undertaken until the person in charge has determined on the basis of visual observation, by himself or a person authorized by him, that every control device and every blocking device necessary to establish and maintain the isolation of the facility
 - (a) is set in the safety position and with the disconnecting contacts of control devices safely separated;
 - (b) bears a distinctive tag or sign designed to notify persons that the operation of the control device and the movement of the blocking device is prohibited during the conduct of the work or test; and
 - (c) is, where physically possible, locked or blocked in the safe position in such a manner that that position cannot be changed without the consent of the person in charge of the work or test;
 - (2) where it is appropriate and to the extent that it is reasonably practicable, isolation of the facility is confirmed by a test; and
 - (3) to the maximum possible extent, no person can inadvertently make the facility live while the work or test is in progress.

40. For the purpose of paragraph 39 (1) (a), the withdrawal to its full extent of a draw-out type electrical switch gear from the other part of that gear shall be deemed to be proper separation of the disconnecting contacts.
41. The person in charge of the work or test referred to in paragraph 39 shall, subject to paragraph 42, have possession or control of the key or other means of locking any control device referred to in paragraph 39 (1).
42. Where it is not reasonably practicable to comply with paragraphs 39 and 41, the person in charge shall ensure that no work on or live test of an isolated electrical facility is undertaken, until a guarantee of isolation as prescribed by paragraph 45 has been given to him.
43. The tag or sign referred to in paragraph 39 (1) (b) shall
 - (1) be suitably identified;
 - (2) contain the words "Do Not Operate", and "Défense d'actionner", or similar words or a symbol conveying the same meaning;
 - (3) where practicable, show the date and the hour, according to the 24 hour clock, that the control device and blocking device referred to in paragraph 39 (1) was set in the safe position;
 - (4) show the name or other means of identification of the person in charge of the work;
 - (5) where used in connection with a live test, be distinctively marked as a testing tag or sign;
 - (6) be removed only by the person in charge of the work or test or a person authorized by him; and
 - (7) be destroyed or used for no other purpose when the work or test is completed.
44. Where more than one person is in charge of any work referred to in paragraph 39, a separate tag or sign referred to in paragraph 39 (1) (b) for each such person shall be applied to each control device and blocking device referred to in paragraph 39.

Guarantees of Isolation for Electrical Facilities

45. No employee shall give or be permitted to give a guarantee of isolation for an electrical facility unless he has been authorized in writing by the department responsible for the electrical facility to give that guarantee.

46. No more than one employee shall be permitted by the department responsible for the electrical facility to give a guarantee of isolation for an electrical facility for the same period of time.
47. Every guarantee of isolation shall be signed by the guarantor and shall state
- (1) the date of issue thereof;
 - (2) the day and hour, according to the 24 hour clock, when the electrical facility will become isolated and, where reasonably practicable, the day and hour, according to the 24 hour clock, when the guarantee will be terminated;
 - (3) the procedures by which isolation will be assured;
 - (4) the name of the person in charge to whom it will be given; and
 - (5) whether live tests will be performed.
48. Where a guarantee of isolation in respect of an electrical facility is given to the person in charge of any work on or live test of the facility, the guarantor shall, whenever it is reasonably practicable to do so, hand a copy of the guarantee to that person before the work or test is undertaken.
49. Where it is not possible for the guarantor to hand a copy of the guarantee of isolation in respect of an electrical facility directly to the person in charge of any work on or live test of the facility, he shall give to that person an oral guarantee of isolation before any work or test is undertaken.
50. The oral guarantee of isolation referred to in paragraph 49 shall be forthwith recorded in writing by the guarantor as well as by the person in charge to whom the guarantee is given.
51. The written record referred to in paragraph 50 shall be signed by the person in charge to whom the guarantee of isolation was given and retained by him until the work on, or live test of, the electrical facility to which the record relates is completed, and he has notified the guarantor that the guarantee is no longer necessary.
52. The department in charge of an electrical facility shall ensure that a copy of every guarantee of isolation and of every written record of an oral guarantee of isolation that is required to be made by this Standard is retained on file for at least one year and be readily available for examination by a safety officer or by any person affected by the guarantee.
53. No guarantee of isolation, or written record thereof in respect of any work on, or live test of, an isolated electrical facility shall be given

to any person in charge of such work or test who has not been authorized in writing by the department in charge of the electrical facility to receive that guarantee or record.

54. Every guarantor shall, before giving a guarantee of isolation, satisfy himself, to the extent that is reasonably practicable, that the work to be done has been properly planned and will be performed in a safe manner.
55. Every person in charge of any work on or live test of an isolated electrical facility to whom a guarantee of isolation has been given shall ensure that all employees who are required to work on that facility are fully informed of the details of the guarantee of isolation, including the part or parts of the facility covered thereby and the exact period of time the facility will be isolated.
56. Where a guarantee of isolation has been given to a person in charge of any work or live test, and that person is replaced at the work site by another person in charge before the guarantee has terminated, that other person shall, if the guarantee is acceptable to him, sign the guarantee, but where, in his opinion the guarantee is not acceptable, he shall obtain a new guarantee from the guarantor.
57. Where the employees working on an isolated electrical facility are divided into two or more crews each of which is supervised by a person in charge of work on the facility, each such person in charge shall obtain a guarantee of isolation before he permits his crew to begin work.
58. Where, in compliance with this Standard, an employee is required to give a guarantee of isolation for an electrical facility that obtains all or any portion of its electrical energy from a source that is not under the direct control of the employee, the department shall ensure that the guarantee shall not be given until the employee has obtained a guarantee of isolation in respect of the source from the person who is in direct control of that source and who is competent and authorized to give the guarantee in respect thereof.
59. Where electrical energy is supplied to an electrical facility from two or more sources which are under the control of other departments or employers, they may cooperatively agree that a guarantee of isolation for that electrical facility will be given in respect of each source of energy by which shall be designated in writing by the other parties or on behalf of one of the parties as the party responsible for giving the guarantee.
60. The party having been designated pursuant to paragraph 59 as responsible for giving the guarantee may
 - (1) act as the guarantor; or
 - (2) designate in writing one or more of its employees to act as the guarantor.

61. Every agreement referred to in paragraph 59 shall state
- (1) the identity of the facility to which the agreement applies;
 - (2) the period during which the agreement will remain in effect;
 - (3) the date of the agreement; and
 - (4) the name of the guarantor or guarantors, as the case may be,
- and shall be signed by the parties thereto.
62. A copy of every agreement referred to in paragraph 59 in respect of any guarantee of isolation shall be readily available to the persons affected by the guarantee while the agreement remains in effect and thereafter be retained by the guarantor for at least one year and be readily available for examination by any such person or by a safety officer.

Live Test of Isolated Electrical Facilities

63. No person shall give or be permitted to give a guarantee of isolation for the performance of a live test of an isolated electrical facility unless he is satisfied that
- (1) every existing guarantee of isolation for that facility is terminated;
 - (2) every person to whom any existing guarantee of isolation was given has been informed of its termination;
 - (3) no other guarantee of isolation has been given in respect of the facility for the period during which the guarantee will be in effect; and
 - (4) any tests to be performed on the facility will not endanger any person working thereon.
64. For the purposes of this paragraph, where a guarantee of isolation for the performance of a live test of an isolated electrical facility is given to a person in charge of the test, that person shall, while the test is being performed, be deemed to be the person in charge of the tests and of any other work that is being performed on the facility while the guarantee is in effect.
65. Every person in charge of a live test shall
- (1) warn all persons who, during or as a result of the test, are likely to be exposed to danger; and
 - (2) after the test, ensure to the extent that is reasonably practicable that safe conditions are established.

Termination of Guarantee of Isolation

66. Subject to paragraph 69, every person in charge of work or tests on an electrical facility to whom a guarantee of isolation is given shall, when the guarantee of isolation is no longer required, personally inform the guarantor that the guarantee is no longer required and provide such other information as the guarantor may require.
67. Any information that is given pursuant to paragraph 66 shall be recorded in writing by
 - (1) the guarantor, or any person who has assumed his responsibilities; and
 - (2) the person to whom the guarantee of isolation was given.
68. Each record made pursuant to paragraph 67 shall show
 - (1) the day and hour, according to the 24 hour clock, when the guarantee of isolation terminated;
 - (2) the name of the guarantor or any person who has assumed his responsibilities;
 - (3) the person to whom the guarantee of isolation was given; and
 - (4) the date and hour in accordance with the 24 hour clock that the guarantor was notified that the guarantee was no longer required.
69. Where it is not reasonably practicable to comply with paragraph 66, the department shall ensure that no guarantor or any other employee shall make live an electrical facility or part thereof for which a guarantee of isolation has been given, until it is established beyond all reasonable doubt that it is safe to do so.

Safety Grounding

70. Subject to paragraphs 71 and 72, where a safety ground has not been applied to an isolated electrical facility and there is any possibility that the facility could become live, no employee shall make or be permitted to make contact with that facility unless the employee follows procedures that are safe for use on live conductors.
71. While any live test is being made on an isolated electrical facility, the safety ground on that facility may be removed for the period of the test only by or under the direction of the person in charge of the test.
72. Safety grounding of an isolated electrical facility is not required if a safety measure is taken that is equally effective and is acceptable to the person in charge of the work.

73. Subject to paragraph 74, no employee shall apply, or be permitted to apply, a safety ground to an electrical facility until the employee has, wherever reasonably practicable, tested that facility to establish that it is isolated.
74. Paragraph 73 does not apply in respect of an electrical facility that is grounded by means of a grounding switch that is an integral part of the facility.
75. Subject to paragraph 76, no employee shall commence work or be permitted to commence work on an electrical facility in an area in which is located any of the following facilities, namely
- (1) a grounding bus;
 - (2) a station grounding network;
 - (3) multi-grounded neutrals or other neutrals;
 - (4) temporary phase grounding; or
 - (5) metal structures;
- unless each such facility is interconnected to the common grounding network.
76. Where, after the interconnections referred to in paragraph 75 are made, a safety ground is required to ensure the safety of an employee while working on an electrical facility referred to therein, the safety ground shall also be connected to the common grounding network.
77. No employee shall attach or be permitted to attach a safety ground to, or disconnect a safety ground from, an isolated electrical facility except in accordance with the following requirements:
- (1) the safety ground shall, to the extent that is reasonably practicable, be attached to the pole, structure, apparatus or other thing upon which the work is to be done;
 - (2) all isolated conductors and all non-insulated surfaces, including the neutral conductor, shall be short-circuited, electrically bonded together and attached by a safety ground to a point of safety grounding in a manner that will establish equal voltage on all surfaces that can be touched by persons who work on the electrical facility;
 - (3) the safety ground shall be attached by means of mechanical clamps that are tightened securely and in direct contact with bare metal;
 - (4) the safety ground shall be so secured that none of its parts can make contact accidentally with any live electrical facility;

- (5) the safety ground shall be attached or removed only with an insulated device or tool;
 - (6) the safety ground shall, before it is attached to an isolated electrical facility, be attached to a point of safety grounding; and
 - (7) the safety ground shall, before being disconnected from the point of safety grounding, be removed from the isolated electrical facility in such a manner that the employee will avoid contact with all live conductors.
78. For the purpose of paragraph 77 a point of safety grounding means
- (1) a grounding bus, a station grounding network, a multi-grounded neutral or other neutrals, a metal pole line structure, or an aerial ground or static wire; or
 - (2) one or more metal rods that are not less than five-eighths of an inch (sixteen millimetres) in diameter and are driven not less than three feet (one metre) into undisturbed compact earth at a minimum distance of fifteen feet (4.5 metres) from the base of the grounded structure of the area where persons on the ground must work and in a direction away from the main work area, but does not include a ground rod at the base of a pole that is not part of a common grounding system.
79. Every conducting part of a safety ground on an isolated electrical facility shall have sufficient ampacity to conduct the maximum current that is likely to be carried on any part of the facility for such time as is necessary to permit operation of any device that is installed so that, in the event of a short circuit or other electrical current overload on the facility, the facility will be automatically disconnected from its source of electrical energy.

Capacitors

- 80. Where a capacitor that has an ampacity and voltage that is dangerous to employees is disconnected from its source of electrical energy, no person shall short-circuit or apply a safety ground to that capacitor within five minutes of the time it was so disconnected, unless the capacitor is already equipped with an adequate short-circuiting and grounding device.
- 81. No employee shall contact or be permitted to contact the terminals of a capacitor referred to in paragraph 80 unless the terminals are short-circuited and safety-grounded.
- 82. The short circuit and safety ground on the capacitor referred to in paragraph 81 shall remain in position until any work on the capacitor that involves contact by an employee is completed and all employees are clear of the work area.

Battery Rooms

83. Every room or area in which storage batteries are being electrically charged shall be
- (1) adequately ventilated to prevent the accumulation of flammable gases;
 - (2) free from all sources of ignition;
 - (3) marked at the entrance thereto with a sign containing:
 - (a) the words "Danger - No Smoking or Open Flames" and "Défense de fumer et D'utiliser une flamme nue" or other similar words in letters not less than two inches (50 mm) in height on a contrasting background; or
 - (b) an approved warning symbol conveying the same meaning as paragraph 83 (3) (a);
 - (4) operated and maintained in accordance with the standards and requirements of the Dominion Fire Commissioner.

Switches and Control Devices

84. Every department shall ensure that
- (1) the path of access to every electrical switch, control device or meter is at all times free from obstruction; and
 - (2) every control device is so designated and located as to permit quick and safe operation at all times.
85. No employee shall install, operate or use, or be permitted to install, operate or use a high voltage electrical switch or other control device for any purpose other than that for which the switch or other device was specifically designed and/or approved.
86. The department performing the work shall ensure that where, for safety reasons, it is necessary that an electrical switch or other device controlling the supply of electrical energy to an electrical facility be operated only by authorized persons, the switch or other device shall be fitted with a locking device or controlled in such a manner that no unauthorized person can operate it.

Conductive Equipment

87. No employee shall use or be permitted to use, a metal rule, or measuring tape, metallic fish wire, wire reinforced fabric tape, wire bound hydraulic hose, portable metal or metal-reinforced ladder or any similar electrically conductive equipment so near to a live electrical facility that such conductive equipment may become live.

Static Electricity

88. Where there is danger to any person because of a flammable or explosive atmosphere, static electricity is to be controlled in accordance with standards or requirements approved and/or authorized by the Dominion Fire Commissioner.

Lightning Protection

89. Every lightning protection device that is provided for any building or other structure is to comply with
- (a) the "Code for Installation of Lightning Rods" published by the Canadian Standards Association in its publication No. B72-1960, as amended from time to time; or
 - (2) any other lightning protection standard approved and/or authorized by the Dominion Fire Commissioner.

TABLE 1
DISTANCES FROM LIVE ELECTRICAL CONDUCTORS

<u>Column I</u>				<u>Column II</u>	<u>Column III</u>	<u>Column IV</u>
Voltage Range of Conductor to Ground				Distance in feet (metres)	Distance in feet (metres)	Distance in feet (metres)
1.	Over	425 to	12,000	10 (3.0m)	3 (1.0m)	1 (0.3m)
2.	Over	12,000 to	22,000	10 (3.0m)	4 (1.2m)	1½ (0.4m)
3.	Over	22,000 to	50,000	10 (3.0m)	5 (1.5m)	2 (0.6m)
4.	Over	50,000 to	90,000	15 (4.5m)	6 (1.8m)	3 (1.0m)
5.	Over	90,000 to	120,000	15 (4.5m)	7 (2.1m)	4 (1.2m)
6.	Over	120,000 to	150,000	20 (6.0m)	9 (2.7m)	5 (1.5m)
7.	Over	150,000 to	250,000	20 (6.0m)	11 (3.3m)	7 (2.1m)
8.	Over	250,000 to	300,000	25 (7.5m)	13 (3.9m)	9 (2.7m)
9.	Over	300,000 to	350,000	25 (7.5m)	15 (4.5m)	11 (3.3m)
10.	Over	350,000 to	400,000	30 (9.0m)	18 (5.4m)	13 (3.9m)

Application

1. This Standard applies to all Public Service Departments and Agencies as defined in Part I of Schedule 1 of the Public Service Staff Relations Act.

Definitions

2. In this Standard

- (1) "Act" means Part IV of the Canada Labour Code;
- (2) "CSA Elevator Code" means the Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks of the Canadian Standards Association standard B44-1975 as amended from time to time;
- (3) "certificate of inspection" means a certificate of licence issued by a Chief Inspector under paragraph 7;
- (4) "Chief Inspector" means the safety officer designated by the Minister as Chief Inspector for elevating devices for a defined geographical area;
- (5) "design" means the plans, patterns, drawings and specifications of an elevating device;
- (6) "elevating device" means a fixed mechanical device for moving passengers or freight and includes an elevator, escalator or dumbwaiter, as defined in the CSA Elevator Code, an inclined lift, moving sidewalk or other similar elevating device but does not include a manlift;
- (7) "major alteration" means those alterations set out in Section 10 of the CSA Elevator Code;
- (8) "manlift" means:
 - (a) a manually controlled passenger hoisting and lowering mechanism that is equipped with a car or platform, the floor area of which does not exceed nine square feet (0.9 m²) and that moves in guides in a substantial vertical direction under electrical or manual power or power provided by a system of counterweights; and,
 - (b) a mechanism having a power driven endless belt that revolves around fixed pulleys at the top and bottom limits of its travel, with attached steps or platforms and handholds for lifting or lowering persons in a substantially vertical direction;

- (9) "maximum carrying capacity" means, with respect to an elevating device, the load that the elevating device is designated and installed to lift safely;
- (10) "Minister" means the Minister of Labour;
- (11) "person in charge" means a qualified person appointed by a department to ensure the safe and proper conduct of an operation or the work of employees;
- (12) "qualified person" means a person who, because of knowledge, training and experience is qualified to perform safely and properly a specified job;
- (13) "Regional Director" means the officer designated by the Minister to serve as Director in an area in which a Public Service occupancy or establishment is located;
- (14) "safety device" means any device intended:
 - (a) to aid in the prevention of the unsafe operation or use of an elevating device; or,
 - (b) to minimize personal injury and property damage.
- (15) "safety officer" means a person designated as a safety officer by the Minister pursuant to Section 87 of the Act; and
- (16) "seal" means to take any measure approved by the Chief Inspector that will effectively prevent the unauthorized operation or use of an elevating device, or manlift.

Specific Application and Exclusions

- 3. Subject to paragraph 4, this Standard applies to all elevating devices and manlifts used in the Public Service.
- 4. This Standard does not apply to
 - (1) a belt, bucket, scoop, roller or similar type conveyor;
 - (2) a portable tiering or piling machine that is used to move material to and from storage and that is located and operated within one storey;
 - (3) equipment for feeding or positioning materials;
 - (4) a hoist for raising or lowering materials that is provided with unguided hooks, slings or similar means for attachment to the materials;

- (5) a lubrication hoist or similar mechanism;
- (6) a lift bridge;
- (7) a railroad car lift or dumper;
- (8) a vertical conveyor that is inoperable from within its car that is not equipped with a platform designed for carrying a person.

Approval and Registration

5. No person shall undertake the installation or major alteration of an elevating device unless the design has been approved by the Chief Inspector.
6. Every elevating device shall be designed, constructed and installed in accordance with the CSA Elevator Code.
7. Where the Chief Inspector is satisfied that an elevating device complies with the minimum standards of the CSA Elevator Code and has been found on inspection to be safe to operate, he shall forthwith issue a certificate of inspection or a licence.

Operation

8. No person shall operate or use an elevating device or permit an elevating device to be operated or used
 - (1) unless a certificate of inspection has been issued in respect of that elevating device; or
 - (2) in excess of the maximum carrying capacity for that elevating device as shown on the certificate of inspection.
9. No person shall alter, interfere with or render inoperative any safety device attached to an elevating device or manlift except for the purpose of testing the safety device in accordance with the instructions of the Chief Inspector or his authorized representative.
10. No person shall operate or use an elevating device or manlift or permit an elevating device or manlift to be operated or used while a safety device connected thereto is inoperative, except for testing purposes authorized by the Chief Inspector or an authorized safety officer.
11. Subject to paragraph 12, no person shall operate or be permitted to operate a passenger elevating device if, in the opinion of the Chief Inspector, he is not qualified to do so.
12. Paragraph 11 does not apply to the operation of a passenger elevating device equipped with automatic controls and emergency stopping devices that ensure the safety of the persons using the elevating device and that are acceptable to the Chief Inspector.

13. A certificate of inspection and any other notices or markings that the Chief Inspector requires to be posted shall be posted near the elevating device to which they apply or in such other place as the Chief Inspector or a safety officer authorized by him may direct.
14. No person, other than the Chief Inspector or a safety officer authorized by him, shall inspect an elevating device.
15. Every elevating device shall be inspected at least once every twelve months unless the period is extended in writing by the Chief Inspector.
16. Notwithstanding paragraph 15, the Chief Inspector or Regional Director may at any time order the inspection of an elevating device or manlift.
17. The department or person in charge of an elevating device or manlift shall, when requested by a person conducting an inspection pursuant to this Standard, provide that person with an assistant who is capable of taking all precautions necessary to ensure that person's safety during the inspection and to otherwise assist him in the safe conduct of the inspection.
18. Where the Chief Inspector, or a safety officer authorized by him to conduct inspections, finds on inspection that an elevating device or manlift is not safe to operate, he shall in accordance with the procedure authorized in the Occupational Safety Policy for the Public Service of Canada:
 - (1) seal the elevating device or manlift; and
 - (2) take possession of or cancel the certificate of inspection, if any.
19. Where the inspection referred to in paragraph 18 is made by a person other than the Chief Inspector that person shall immediately notify the Chief Inspector that the use of the elevating device or manlift is prohibited.
20. The department or person in charge of an elevating device or manlift shall, upon discovery of any defect or condition in the elevating device or manlift that may render it unsafe to operate, immediately notify the Chief Inspector or the nearest Regional Office of Labour Canada.

Maintenance and Repair

21. The department or person in charge of an elevating device or manlift shall ensure that it is maintained and repaired in accordance with any standard that follows good general industrial safety practice and that is acceptable to the Regional Director or the Chief Inspector.
22. No person shall carry out maintenance or repair work on an elevating device or manlift unless he is a qualified person.

Manlifts

23. Where manlift safety requirements are prescribed in a statute set out in Column II of Table I, all manlifts installed on or after the coming into force of this Standard in a Public Service establishment in the province set out in Column I opposite that statute shall comply with these requirements.
24. All manlifts installed on or after the coming into force of this Standard in a Public Service establishment in a province set out in Column I of Table I and for which manlift safety requirements are not prescribed under the statute set out opposite that province in Column II thereof shall
 - (1) in the case of a manlift described in paragraph 2 (8) (a), be installed and comply with any standard that follows good general industrial safety practice and that is acceptable to the Regional Director or the Chief Inspector;
 - (2) in the case of a manlift described in paragraph 2 (8) (b), comply with the American National Standards Institute standard for Manlifts A90.1-1969 as amended from time to time, or any other standard acceptable to the Regional Director or Chief Inspector.
25. Where a manlift that was installed prior to the coming into force of this Standard is declared in writing by a safety officer or by an authorized representative of the Chief Inspector to be unsafe, the department responsible for the operation and maintenance of that manlift shall ensure that it is not operated or used until it has been repaired or altered to the satisfaction of the Chief Inspector or the Regional Director.

Reporting of Accidents

26. Departments shall ensure that the person in charge of an elevating device or manlift maintains a complete record, in a form acceptable to the Chief Inspector, of every accident involving that elevating device or manlift.
27. The record referred to in paragraph 26 shall be available for examination by a safety officer within 72 hours of the accident.
28. Departments responsible for the operation and maintenance of an elevating device or manlift shall ensure that the Chief Inspector is notified as soon as reasonably practicable and in no case later than 24 hours of any accident or occurrence that results in
 - (1) the elevating device or manlift falling freely;
 - (2) a fatality;

- (3) an injury to any person that requires attention by a medical practitioner; or,
 - (4) damage requiring repairs by an elevator mechanic.
29. Subject to paragraph 27, no person shall disturb, destroy or alter any wreckage of an elevating device or manlift without permission from a safety officer.
30. The wreckage of an elevating device or manlift may be moved to the extent necessary to permit the safe removal of an injured person.

Note: The standards referred to in this Standard are available from the sources indicated hereunder:

Canadian Standards Association standards:

Canadian Standards Association,
178 Rexdale Boulevard,
Rexdale, Ontario.
M9W 1R3

American National Standards Institute standards:

American National Standards Institute,
1403 Broadway,
New York, New York 10018,
U.S.A.

TABLE I
PROVINCIAL ELEVATING DEVICE STATUTES

<u>COLUMN I</u>	<u>COLUMN II</u>
1. Alberta	- <u>The Elevator and Fixed Conveyances Act</u> being Chapter 17 of the Statutes of Alberta, 1962.
2. British Columbia	- Part II of the <u>Factories Act</u> being Chapter 14 of the Statutes of British Columbia, 1966.
3. Manitoba	- <u>The Elevator Act</u> being Chapter 26 of the Statutes of Manitoba, 1963.
4. New Brunswick	- <u>Elevators and Lifts Act</u> being Chapter 4 of the Statutes of New Brunswick, 1960.
5. Newfoundland	- <u>The Elevator Act</u> , 1969 being Chapter 63 of the Statutes of Newfoundland and Labrador, 1969.
6. Northwest Territories	- Elevator and Fixed Conveyances Regulations under <u>The Workmen's Compensation Ordinance</u> being Chapter 22 of the Ordinances of the Northwest Territories, 1967.
7. Nova Scotia	- <u>Elevators and Lift Act</u> being Chapter 8 of the Revised Statutes of Nova Scotia, 1967.
8. Ontario	- <u>The Elevators and Lifts Act</u> being Chapter 119 of the Revised Statutes of Ontario as amended by Chapter 38 of the Statutes of Ontario, 1965.
9. Prince Edward Island	- <u>Elevators and Lifts Act</u> , being Chapter 20 of the Statutes of Prince Edward Island, 1970.
10. Quebec	- <u>Public Building Safety Act</u> being Chapter 149 of the Revised Statutes of Quebec and the <u>Industrial and Commercial Establishments Act</u> being Chapter 150 of the Revised Statutes of Quebec.

11. Saskatchewan

- The Passenger and Freight Elevator Act
being Chapter 376 of the Revised Statutes
of Saskatchewan, 1965.

12. Yukon Territory

- Elevator and Fixed Conveyances Ordinance,
being Chapter E3 of the Ordinances of the
Yukon Territory, 1971.

FIRST AID STANDARD

TB STD 3-5

PART I

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

General Requirements

2. First aid facilities shall be located convenient to the main working areas, and shall be accessible to all employees.
3. All employees shall make themselves aware of the location of first aid facilities, and signs showing the exact location of first aid facilities shall be posted in conspicuous places in the work area.
4. Emergency telephone numbers shall be prominently displayed near all first aid facilities and at other strategic locations, as required.
5. First aid facilities shall be kept in a clean and orderly condition, and supplies shall be maintained to the required standard at all times.
6. Departments shall maintain strict control of first aid facilities and supplies in order to restrict their unauthorized use or removal, and such facilities shall normally be assigned to the care of an employee trained in first aid.

First Aid Kits and Supplies

7. General Purpose First Aid Kits type "A", "B", or "C" shall be installed and maintained at each place of employment, according to the number of employees in a local area, and in compliance with Table I.
8. Government owned or leased motor vehicles may, at the discretion of a department, be equipped with a General Purpose First Aid Kit, type "A". In the case of smaller vehicles such as snowmobiles, a smaller more compact kit, such as the Pocket Kit - Field Operations referred to in Part II of this Standard, may be used.
9. Where, owing to the existence of unusual and variable occupational hazards such as those found in laboratories or similar work areas, there may be an apparent requirement for special additional emergency first aid equipment or procedures, departments shall consult the Director, Emergency Health Services, Medical Services Branch, Health and Welfare Canada for confirmation as to the need for such additional measures.

First Aid Rooms

10. A first aid room shall be provided in each building in which 200 or more employees on any shift are located. A first aid room may be provided where less than 200 persons are employed, if justified according to the type of operations and the accident risk and experience involved. A first aid room is not required in a building in which a Health Unit is situated.
11. Where, in a building shared by departments, the total number of employees of all departments exceeds 200, a common first aid room may be established under co-ordinated control as agreed upon by the departments involved. Should the provision of a common first aid room prove impracticable, first aid kits as required by paragraph 7 shall be installed and maintained by individual departments.
12. First aid rooms shall encompass a minimum area of 150 square feet (15m²) or more depending on the number of employees to be served, and shall be located within easy access of toilet facilities.
13. First aid rooms shall be equipped with:
 - (1) adequate lighting, heat and ventilation;
 - (2) hot and cold running water;
 - (3) a liquid soap dispenser;
 - (4) a separate cubicle or curtained off area with a cot or bed;
 - (5) a cabinet or cupboard space with a lock, suitable for the storage of medical supplies and equipment;
 - (6) a suitable table and several chairs;
 - (7) a paper towel dispenser;
 - (8) a paper cup dispenser;
 - (9) a flashlight;
 - (10) a telephone, with emergency numbers conveniently posted;
 - (11) a first aid treatment record book;
 - (12) a type "A" kit for mobile use at the scene of an accident;
 - (13) medical supplies and equipment according to Table II

First Aid Training

14. Sufficient numbers of employees shall be trained to administer first aid and shall be readily available to render first aid during their working hours.
15. Since requirements concerning the number of employees trained in first aid are variable, departmental officials shall decide the number required at each location based on the number and location of the first aid stations, the nature of the work, and the accident experience and risk. In any work area, however, at least one employee trained in first aid shall be available at all times during each shift or working period.
16. Employees authorized to administer first aid will, as a minimum, hold a St. John Ambulance Standard Certificate in good standing, or equivalent qualification approved by the Director, Emergency Health Services, Medical Services Branch, Health and Welfare Canada. Departments shall maintain records of each such employee's first aid certification and ensure up-dated certification as required. Lists indicating the names of the employees, according to their departmental location and certification status, shall be maintained and be available on request by Health and Welfare Canada.
17. Departments shall co-ordinate arrangements for first aid training in the Ottawa-Hull area through the Director, Emergency Health Services, Medical Services Branch, Health and Welfare Canada. At other locations, departments may make arrangements for training directly with the nearest office of the St. John Ambulance Association, or utilize other available training resources, provided such training results in a level of proficiency required under paragraph 16. The cost of any first aid training provided in accordance with this Standard will be borne by the employee's department.

First Aid Treatment and Reporting

18. Any employee, upon sustaining an injury, shall where possible, report to the nearest first aid station for treatment, and as soon as possible thereafter supply all pertinent information relative to the injury to the person in charge of the work.
19. First aid record books shall be maintained by the first aid attendant at or near each first aid facility, and shall be used to record the dates and details of all injuries reported by employees, and the treatment given.
20. Any injury which requires professional medical treatment shall be reported immediately to the person responsible for the completion of the "Employer's Report of an Accident", in order that such report may be submitted in accordance with procedures for reporting injuries pursuant to the Government Employees Compensation Act.

21. Responsible personnel shall be designated to inspect first aid record books at regular intervals to verify their proper maintenance, and to ensure that the requirements of paragraph 19 are followed.
22. Any suspected radiation injury, or accidental exposure even without immediately apparent injury, should be promptly reported to the Radiation Protection Bureau of Health and Welfare Canada.

FIRST AID STANDARD

PART II

FOR FIELD SURVEY, FIELD OPERATIONS AND ISOLATED PARTIES

General Requirements

23. Departments shall provide first aid service in accordance with this Standard for all field survey and field operations parties, or parties operating in isolated areas where adequate medical treatment facilities do not exist.
24. An isolated area, for purposes of this Standard, is an area which is generally more than two hours travel time by available transportation from the nearest medical treatment facility (medical centre, hospital, clinic, or doctor's office). However, a department may in any unusual circumstances such as unreliable transportation, etc., apply this Standard to groups who will operate at locations less than two hours travel time from such facility.
25. Before proceeding to an isolated area, the person in charge of a party shall contact the medical treatment facility nearest the intended work area to arrange for emergency services. Normally, the Regional Medical Services offices shall be contacted for this purpose.
26. When groups will be operating in isolated areas where emergency medical services or supplies are not readily available, departments shall submit a request to the Director, Emergency Health Services, Medical Services Branch, Health and Welfare Canada, for any special medical supplies and appropriate directions and training concerning their use.
27. Whenever a camp is to be set up as a base for operations, the person in charge shall arrange for the establishment of emergency procedures for the transport and treatment of injured persons, and shall ensure that all persons in the party are aware of such procedures.
28. Communications facilities by landline or radio shall be established between such camps and those facilities which can provide emergency medical advice and/or rescue services. When the circumstances warrant, and where practicable, communication facilities should also be arranged between base camps and parties working out of these camps.

First Aid Supplies

29. First aid supplies shall be assigned to the care of a person competent to administer first aid treatment, and appropriate measures shall be taken to ensure that supplies are maintained at the required levels.
30. Every main field party shall be equipped with a first aid kit containing, as a minimum, the items listed in Table III, Standard Kit.
31. Each party detached from the main field party shall be equipped with a first aid kit containing, as a minimum, the items listed in Table III, Intermediate Kit. Such kits shall be additional to the Standard Kit at the base camp.
32. Individual members of a party including those operating snowmobiles, boats, etc., who will be isolated during operations shall be supplied with a pocket kit containing, as a minimum, the items listed in Table III, Pocket Kit.
33. Land vehicles used for transportation of personnel to and within isolated areas shall be equipped with a first aid kit Type "A", as specified in Table I.

First Aid Training

34. Departments shall ensure that at least two members of each main field party are trained in first aid, and employees authorized to administer first aid treatment shall hold as a minimum a St. John Ambulance Standard First Aid Certificate, or equivalent qualification approved by the Director, Emergency Health Services, Medical Services Branch, Health and Welfare Canada. Departments shall maintain records of each such employee's first aid certification, and shall initiate re-certification when required. These records shall be available to Health and Welfare Canada on request.
35. Persons assigned to administer first aid shall be trained in the application of any special techniques or medications which may be required.
36. Each department shall be responsible for paying the cost of first aid training, and shall make arrangements for such training in accordance with instructions contained in Part I.

Reporting of Injuries

37. The reporting and recording of injuries will be controlled in accordance with instructions contained in Part I.

TABLE I
SCHEDULE OF FIRST AID SUPPLIES FOR FIRST AID

Type A - Up to 9 Employees, and Motor Vehicles

Type B - 10 to 50 Employees

Type C - 51 to 200 Employees

<u>Description</u>	A	B	C	<u>Stock No.</u>
First Aid Kit, Type A, complete	1			6545-21-852-9432
First Aid Kit, Type B, complete		1		6545-21-852-9433
First Aid Kit, Type C, complete			1	6545-31-852-9434
<u>Kit Contents</u>				
Adhesive Tape, surgical	1	1	2	6510-00-203-5000
Applicator, disposable, Package of 25	2	4	4	6515-21-852-9428
Bandage, adhesive, Box of 100	1	1	1	6510-21-845-2239
Bandage, felt, orthopaedic	-	2	2	6510-21-116-0170
Bandage, gauze	-	6	8	6510-21-116-0174
Bandage, gauze	3	6	8	6510-21-116-0175
Bandage, gauze	-	6	8	6510-21-849-9537
Bandage, mulsin, Package of 2 triangular bandages	1	3	6	6510-21-116-0180
Basin, wash*	-	-	1	6530-21-845-9260
Benzalkonium chloride tincture	1	3	3	6505-21-852-9421
Blanket, bed, grey*	-	-	2	7210-21-849-9452
Book, Pocket guide to First Aid English and French	1	-	-	7610-21-843-6190
Book, record	1	1	1	7530-21-852-9254
Brush, scrub	-	-	1	7920-21-116-2811
Case, first aid kit	1	-	-	6545-21-852-9431
Case, first aid kit	-	1	-	6545-21-852-9429
Case, first aid kit	-	-	1	6545-21-852-9430
Chart	1	1	1	6545-21-852-9425
Cotton, purified	2	4	16	6510-21-116-0197
Cup, paper, Box of 250	-	-	2	7350-21-840-9239
Depressor, tongue, wood, Package of 25	2	4	4	6515-21-852-9427
Dressing, first aid, field	2	2	2	6510-21-102-7867
Dressing, surgical, combination	-	2	3	6510-21-849-9539
Forceps, splinter	1	1	1	6515-00-337-2400
Litter, folding, rigid pole*	-	-	1	6530-21-848-4908
Pad, cotton	1	2	4	6510-21-845-2189
Pin, safety, Card of 9	1	1	2	8315-21-843-6856

Scissors, bandage	1	1	1	6515-00-363-8800
Shield, eye, surgical	1	2	4	6515-21-116-3164
Soap, surgical	-	-	1	6505-21-114-6330
Splint set, wood, set of 8 pair	-	1	1	6545-21-116-2912
Sponge, surgical, 2 per envelope	6	12	24	6510-21-845-2171
Sponge, surgical, 2 per envelope	6	12	24	6510-21-845-2440

NOTES:

1. Additional for Motor Vehicles -
Dressing, first aid, field 2 6510-21-102-7867
2. Items marked with an asterisk
are not included in kits, and
must be ordered separately.

TABLE II

SCHEDULE OF FIRST AID SUPPLIES FOR FIRST AID ROOM
(over 200 Employees on any shift)

<u>Description</u>	<u>Quantity</u>	<u>Stock No.</u>
First Aid Kit, Type A, Complete	1	6545-21-852-9432
Adhesive Tape, surgical	3	6510-00-203-5000
Applicator, disposable, package of 25	4	6515-21-852-9428
Bag, ice throat	1	6530-00-770-7500
Bag, hot water	1	6530-21-116-0396
Bandage, adhesive, box of 100	1	6510-21-845-2239
Bandage, felt, orthopaedic	2	6510-21-116-0170
Bandage, gauze	12	6510-21-116-0174
Bandage, gauze	12	6510-21-116-0175
Bandage, gauze, sterile	12	6510-21-849-9537
Bandage, muslin, triangular, package of 2	6	6510-21-116-0180
Basin, wash	2	6530-21-846-9260
Bed, hospital, folding	1	6530-21-840-9828
Benzalkonium chloride tincture	6	6505-21-852-9421
Blanket, bed, grey	2	7210-21-849-9452
Book, record	1	7530-21-852-9254
Bottle, screw cap	1	6530-21-852-9451
Brush, scrub, nail	1	7920-21-116-2811
Chart, St. John's Ambulance	1	6545-21-852-9425
Cloth, coated (rubber sheeting)	2	8305-21-112-4005
Cotton, non-sterile	1	6510-21-116-0194
Cup, paper, conical, package of 10	2	7350-21-852-9407
Depressors, tongue, package of 25	4	6515-21-852-9427
Domiphen Bromide powder	20	6505-21-848-0161
Dressing, first aid, field	6	6510-21-102-7867
Dressing, surgical	6	6510-21-849-9539
Forceps, hemostatic	1	6515-21-116-4037
Forceps, splinter	1	6515-00-337-2400
Gloves, rubber, domestic	1	8415-21-116-0412
Gloves, surgeon	1	6515-21-849-9600
Isopropyl alcohol	1	6505-21-852-9420
Litter, folding	1	6530-21-848-4908
Medicine cup, graduated	1	6530-21-846-9540
Pad, cotton, sterile (eye pads)	4	6510-21-845-2189
Pail, metal, white	1	7240-21-847-4015
Pin, safety, card of 9	2	8315-21-843-6856
Pipette, dropping (eye dropper)	1	6530-21-116-2883
Scissors, bandage	1	6515-00-363-8800
Shield, eye, surgical	4	6515-21-116-3164
Soap, surgical	1	6505-21-114-6330

Splint set, set of 8 pair	1	6515-21-116-2912
Sponge, surgical	100	6510-21-845-2171
Sponge, surgical	100	6510-21-845-2440
Tray, instrument, enamel	1	6530-21-116-2948
Tray, portable	1	3990-21-852-3483

TABLE III
SCHEDULE OF FIRST AID KITS AND SUPPLIES FOR
FIELD SURVEY, FIELD OPERATIONS AND ISOLATED PARTIES

<u>Description</u>	S	I	P	<u>Stock No.</u>
Standard Kit - Container and Kit, complete	1			6545-21-870-6176
Intermediate Kit - Container and Kit, complete		1		6545-21-870-6177
Pocket Kit - Complete			1	6545-21-870-6178
<u>Kit Contents</u>				
Acetaminophen tablets, bottle of 100	1	1	-	6505-21-870-6175
Adhesive tape, surgical	1	1	-	6510-00-203-5000
Aluminum hydroxide and Magnesium Carbonate Gel Tablets, Bottle of 50	2	2	-	6505-21-857-6473
Applicator, disposable, Cotton tipped, Package of 100	1	-	-	6515-21-844-5204
Bandage, adhesive, butterfly closure Box of 100	1	1	-	6510-21-845-2182
Bandage, adhesive, sterile gauze dressing, Box of 25	-	1	1	6510-21-845-2238
Bandage, adhesive, sterile gauze dressing, Box of 100	1	-	-	6510-21-845-2239
Bandage, cotton, elastic	4	2	-	6510-21-845-2448
Bandage, gauze	6	4	-	6510-21-116-0175
Bandage, muslin, package of 2 triangular bandages	8	4	1	6510-21-116-0180
Bath, eye	1	-	-	6515-21-844-5214
Blanket, emergency, pocket	-	-	1	7210-21-870-6172
Book, first aid, English	1	-	-	7610-21-848-3664
Book, first aid, French	1	-	-	7610-21-848-3665
Book, Pocket Guide to First Aid, English and French	-	1	-	7610-21-843-6190
Book, record	1	-	-	7530-21-852-9254
Brush, scrub	1	-	-	7920-21-116-2811
Calamine lotion	1	1	-	6505-21-870-6173
Case, first aid kit	1	1	-	6545-21-852-9429
Case thermometer	1	-	-	6515-21-857-9045
Clove oil, chloroform and creosote solution Vial of one dram	1	-	-	6505-21-843-5342
Cotton, purified	6	6	-	6510-21-116-0197
Depressor, tongue, wood, Package of 25	4	-	-	6515-21-852-9427

Detergent, surgical	1	1	-	6505-21-857-6317
Dressing, first aid, field	12	-	1	6510-21-116-0200
Dressing, first aid, field	12	-	1	6510-21-102-7867
Dressing, petrolatum, Box of 36	1	-	-	6510-21-860-7582
Forceps, hemostatic	1	-	-	6515-21-116-4057
Forceps, splinter	1	1	-	6515-00-337-2400
Field Medical Card	20	-	-	7530-21-870-5029
Halazone tablets, Bottle of 100	2	-	-	6505-21-857-6882
Litter, rigid, Stokes	1	-	-	6530-21-851-3111
Pad, cotton	12	6	-	6510-21-845-2189
Pad, nonadherent, Bag of 200	-	1	-	6510-21-845-2196
Pin, safety, Card of 9	4	-	-	8315-21-843-6856
Scissors, bandage	1	1	-	6515-00-363-8800
Shears, straight, trimmers	1	-	-	5110-21-116-4924
Shield, eye, surgical	1	-	-	6515-21-116-3164
Soap, green, tincture	1	-	-	6505-21-870-6174
Splint set, wood, set of 8 pairs	1	1	-	6545-21-116-2912
Sponge, surgical, 2 per envelope	12	4	-	6510-21-845-2440
Thermometer, clinical, human	1	-	-	6515-21-116-2928
Waste, matted yarns	1	1	-	8305-21-116-0248

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard
 - (1) "explosive actuated tool" means a tool that is designed to be held in the hand and that is actuated by an explosive charge;
 - (2) "hand tool" means a tool that is designed to be held in the hand and that is operated by manual power;
 - (3) "portable power tool" means a tool that is designed to be held in the hand and that is operated by any source of power other than manual power;
 - (4) "person in charge" means a qualified person appointed by management to supervise the safe and proper conduct of an operation or the work of employees.

Design and Construction

3. To the extent that it is reasonably practicable, departments should ensure that all hand tools and portable power tools have been designed and constructed so as to be safe under all conditions of intended use.
4. Every electric portable tool used shall be of a type intended for commercial or industrial use, and certified as safe for its intended purpose by the Canadian Standards Association, or some other recognized testing agency recommended by a Regional Director of Labour Canada.
5. In any place where there is a risk that an explosive or flammable atmosphere is likely to be ignited by sparks, only those tools having an exterior surface made of non-sparking material are to be used.
6. Where an electric portable power tool is used in a hazardous location, it is to be of a type that complies with the appropriate recommendation of Part I of the Canadian Electrical Code, Canadian Standards Association standard C22.1-1975, Safety Standards for Electrical Installations, as amended from time to time.
7. Every electric portable power tool that is used shall be grounded in accordance with Part I of the Canadian Electrical Code, Canadian Standards Association standard C22.1-1975, as amended from time to time.

8. Paragraph 7 does not apply to a portable power tool that is operated by a self-contained battery, or to a portable power tool that is designated to be safe for use without grounding and has been certified by the Canadian Standards Association as safe for such use.
9. No employee shall ground an electric portable power tool described in paragraph 8 where the housing and shaft of the tool are completely insulated from its electrical components.
10. Where air hoses are connected to portable power tools, restraining devices shall be fitted on all hose connections to prevent injury to an employee in the event of the inadvertent disconnection of any hose, and a restraining device shall be fitted on a tool where a person might be injured by its falling.
11. The shaft of any flexible shaft portable power tool is to be protected from denting and kinking.
12. Every explosive actuated portable power tool used is to be designed and constructed in accordance with
 - (1) the Canadian Standards Association Safety Code for Explosive Actuated Fastening Tools, Standard Z166-1975 as amended from time to time; or
 - (2) any other standard that follows good industrial safety practice and is recommended by a Regional Director of Labour Canada.

Operation and Use

13. All hand tools and portable power tools shall be operated and used in accordance with good industrial safety practice.
14. No employee is to use an explosive actuated tool without the approval of the person in charge and unless he possesses an operator's certificate issued by the manufacturer, or he has been trained in the use of the tool in accordance with a standard that follows good industrial safety practice.
15. An employee shall not be permitted to use a hand tool or portable power tool unless he is qualified by his knowledge, training and experience, and is authorized to do so.
16. Where necessary, a manual of operating instructions for a hand tool or portable power tool shall be readily available to any employee who is required to use that tool.
17. Where it is necessary to remove or change an attachment, or make any adjustment or repair to a portable power tool, such work shall not proceed unless the tool is disconnected from its power source in a manner that ensures that it cannot be inadvertently reconnected.

18. Employees who use a pneumatic portable power tool shall shut off the air supply to that tool and bleed the air line before disconnecting it from the tool, unless the air line is equipped with a quick disconnect coupling that makes such precautions unnecessary.
19. No person is to use a pneumatic portable power tool or air hose in such a manner that an air stream might be directed forcibly against his/her body, or the body of any other person.
20. Employees shall ensure that the tool end of any flexible shaft portable power tool is secured in a manner that will prevent the flexible shaft from whipping when the motor is started.

Inspection and Maintenance

21. Departments shall ensure that all hand tools and portable power tools used are inspected at regular intervals and maintained in a safe working condition in accordance with good industrial safety practice.
22. A hand tool and portable power tool inspection and maintenance plan shall be instituted by departments and a record kept of all inspections and maintenance work performed in accordance with such plan.
23. Each tool or tool accessory shall be checked by employees before use to ensure that there is no visible defect that might render it unsafe. Any such defect is to be reported promptly to the person in charge.
24. Any tool or tool accessory having a defect that might render it unsafe for use must be reported to the person in charge and the tool shall be marked or tagged and removed from service.

Transport and Storage

25. Hand tools or portable power tools shall be transported and stored in a safe manner.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard

- (1) "blanking off" means preventing the flow of any substance to or from a confined space by means of a solid plate that completely blocks the flow of such material, and that is not dependent for its effectiveness on a valve or similar device;
- (2) "breathing apparatus" means an approved apparatus that, in an oxygen deficient atmosphere or an atmosphere contaminated by a toxic or dangerous substance, will provide oxygen or an adequate supply of air that is safe to breathe to a person engulfed in that atmosphere, and includes breathing apparatus approved by the United States Bureau of Mines;
- (3) "approved" means approved by Labour Canada or Health and Welfare Canada;
- (4) "hazardous confined space" means a tank, silo, storage bin, process vessel or other enclosure, not designed or intended for human occupancy, in respect of which special precautions are necessary when an employee is required to enter, to protect the employee from a dangerous atmosphere, prevent the employee from becoming entrapped in stored material, or otherwise ensure the employee's safety;
- (5) "oxygen deficiency", with respect to the atmosphere in a confined space, means a concentration of oxygen by volume in the atmosphere that is less than seventeen percent;
- (6) "qualified person" means a person who because of his knowledge, training and experience is qualified to perform safely and properly a specified task where required in this Standard;
- (7) "person in charge" means a qualified person appointed to ensure the safe and proper conduct of an operation or the work of employees;
- (8) "safe level", with respect to the atmosphere of a confined space, means that the level or concentration of airborne contaminants in the atmosphere

- (a) does not exceed the maximum levels for airborne contaminants recommended by the American Conference of Governmental Industrial Hygienists in its pamphlet "Threshold Limit Values of Airborne Contaminants for 1976" and amendments thereto;
 - (b) is less than the lower limits for flammable or explosive atmospheres as may be specified in Fire Protection Engineering Standards issued by the Dominion Fire Commissioner; or
 - (c) does not exceed such other limits as may be indicated by good industrial safety practice.
- (9) "safety officer" means a person designated as a safety officer by the Minister of Labour pursuant to Part IV of the Canada Labour Code;
- (10) "ventilation equipment" means a fan, blower, induced draft or other ventilation device used to force a supply of fresh, respirable, atmospheric air into an enclosed space or to remove ambient air from such space.

Entry Into Hazardous Confined Spaces

- 3. No employee shall enter or be permitted to enter a hazardous confined space unless such entry is made in compliance with the requirements of this Standard, and the hazardous confined space has a manhole or other opening that affords the employee safe entry to and exit from all accessible parts of the confined space when he is wearing all protective or other equipment that may be prescribed herein.
- 4. Departments shall ensure that persons in charge take effective measures to prevent the inadvertent or accidental entry of any employee into a hazardous confined space.
- 5. Where an employee is required to enter a hazardous confined space, the hazard of the confined space shall, prior to such entry, be evaluated by a qualified person who shall set out the following in writing:
 - (1) a report of the hazard evaluation;
 - (2) the pre-entry and other procedures to be carried out with respect to the hazardous confined space; and
 - (3) the emergency and rescue procedures to be implemented in the event of a mishap in the hazardous confined space.
- 6. A copy of the hazard evaluation report and all the procedures referred to in paragraph 5, including the results of any test conducted in connection with the evaluation or immediately prior to or during each entry, shall be retained on file for as long as the evaluation and procedures are valid.

7. An employee shall not enter or be permitted to enter a hazardous confined space until he has been made aware of the hazards of such entry, advised of the precautions to be observed, and instructed and trained in the proper and safe conduct of the procedures referred to in paragraph 5.
8. In addition to the requirements of paragraph 7, the person in charge shall obtain the signature of the employee on a dated copy of the hazard evaluation report and the procedures referred to in paragraph 5, prior to the employee's first entry into a hazardous confined space.
9. Each entry by an employee into a hazardous confined space shall be observed by a person in charge and, where deemed necessary by the person in charge, a qualified person shall remain at the place of entry until the duties are completed.
10. Subject to paragraphs 13, 14, and 15, no employee shall enter or be permitted to enter a hazardous confined space until
 - (1) the concentration of toxic, flammable, explosive, radio-active, infectious or other airborne dangerous substance therein is reduced to and maintained at a safe level as confirmed by a test that is conducted by a qualified person and is suitable for the hazard involved;
 - (2) any oxygen deficiency is corrected;
 - (3) any liquid in which a person may drown or any free flowing solids in which a person may become entrapped are removed from the hazardous confined space; and
 - (4) the entry of any liquid, free flowing solids or any dangerous substance into the hazardous confined space is prevented by disconnection, or blanking off. For any other acceptable precaution, departments are to seek the advice of the Regional Director of Labour Canada.
11. The person in charge shall ensure that
 - (1) no cleaning, painting, coating, lining, welding or other operation performed by an employee after he has entered a confined space produces a hazardous condition therein; and
 - (2) where the safety of the hazardous confined space can only be guaranteed for a limited time, any employee who enters the hazardous confined space leaves it before the expiry of the limited time.
12. The documents described in paragraph 6, including the results of any tests conducted in accordance with paragraph 10 (1), shall be readily available for examination upon request by a safety officer, or by any employee who is required to enter the hazardous confined space to which the documents or records relate.

13. Where, with respect to a hazardous confined space, it is not reasonably practicable to reduce and maintain the concentration of toxic airborne dangerous substances to a safe level or to correct an oxygen deficiency therein, or to completely remove a liquid or free flowing solids therefrom, an employee may be permitted to enter such confined space provided that all of the following conditions are met
 - (1) he is wearing an approved breathing apparatus where there is an oxygen deficiency or an inhalable dangerous substance in the hazardous confined space;
 - (2) he is wearing a safety harness or other similar safety equipment, securely attached to a lifeline that is attached to a secure anchor outside the hazardous confined space, and controlled by an employee who is trained in the emergency and rescue procedures referred to in paragraph 5 (3), and who is provided with a suitable alarm device to summon assistance;
 - (3) the entry of material into the confined space is prevented in a manner described in paragraph 10 (4);
 - (4) additional trained employees, one or more of whom shall be the holder of a valid St. John Ambulance Standard First Aid Certificate or a first aid certificate of higher competency, are readily available in the immediate vicinity of the hazardous confined space if such employee cannot be removed without the aid of such trained employees;
 - (5) the concentration of any flammable or explosive substance is reduced to and maintained at a level below the lower flammable or explosive limit of that substance; and
 - (6) any additional special precautionary measures that may be prescribed for entry into the hazardous confined space are complied with.
14. An employee shall not undertake or be permitted to undertake rescue operations, as described in paragraph 13 (4), unless he has been trained to conduct such rescue operations and is equipped with such breathing apparatus and other equipment as may be necessary to conduct the rescue operation safely.
15. The person in charge shall, where reasonably practicable, ensure, relative to paragraph 13 (4), that breathing apparatus or a source of air that is safe to breathe is available for the use of an employee being rescued.
16. Notwithstanding the requirements of paragraph 13 (2), an employee may, without wearing a safety harness, enter a hazardous confined space containing granular or other free flowing solids that are non-toxic and non-corrosive, for the purpose of removing such solids or for the purpose of cleaning the hazardous confined space, provided that all of the following conditions are met:

- (1) the atmosphere therein complies with the requirements of paragraphs 10 (1) and 10 (2);
- (2) all material that will flow out by means of gravity has been discharged from the confined space;
- (3) the entry of material into the confined space is prevented in a manner described in paragraph 10 (4);
- (4) the discharge opening and equipment are inoperative or are guarded so that an employee in the confined space cannot fall into the opening or be injured by the equipment; and
- (5) any accumulation of material in the hazardous confined space is not sufficient to entrap an employee who enters the confined space.

Ventilation Equipment

17. No employee shall enter or be permitted to enter a hazardous confined space that is dependent on ventilation equipment to provide a safe atmosphere unless
 - (1) in the event of a failure of the ventilation equipment, sufficient time will be available for the employee to escape from the confined space before the contamination of the atmosphere therein exceeds the safe level, or an oxygen deficiency occurs therein;
 - (2) the ventilation equipment is either equipped with an approved alarm, the significance of which has been demonstrated to employees concerned, or monitored by an employee concerned, or monitored by an employee who is in constant attendance on the ventilation equipment and who will sound an alarm to signal faulty operation or loss of ventilation; and
 - (3) the entry procedures referred to in paragraph 5 provide that when the appropriate alarm sounds, or there is any significant change in ventilation, every employee must leave the hazardous confined space immediately.

Inspection and Maintenance

18. All testing equipment, safety harnesses, lifelines, breathing apparatus, ventilation equipment and any other equipment used in connection with entry into a hazardous confined space by any employee shall be inspected, maintained and tested by a qualified person as frequently as is necessary to ensure that it is in a safe condition for use at all times, but not less frequently than is recommended by the manufacturer.
19. Departments shall ensure that a complete record is kept with respect to the inspection, maintenance and tests referred to in paragraph 18, showing

- (1) the date of the inspection, maintenance or test;
 - (2) any defects noted during the inspection or test;
 - (3) the nature of any repairs made;
 - (4) the name of the qualified person who conducted the inspection, maintenance or test; and
 - (5) the date of each use of the equipment, and the reason for or manner of its use.
20. Every record that is kept pursuant to paragraph 19 shall be readily available for examination for a period of not less than two years.
21. The person in charge shall ensure that all equipment found to be defective in any way that significantly affects its efficiency or safety is tagged with a warning tag bearing the words "Unsafe, Do Not Use" or similar wording, and is repaired as soon as possible prior to return to service.
22. Every employee shall visually examine any breathing apparatus, safety harness or other safety equipment that he is required to use in a hazardous confined space to ensure that, within the limits of such an inspection and before he enters a hazardous confined space, he considers it safe to use.
23. If, as a result of the inspection referred to in paragraph 22, an employee finds that the equipment he is to use is defective, he shall
- (1) if the defect in his opinion could be the cause of danger to himself or to any other employee, or could significantly reduce the reliability or effectiveness of the equipment, report the defect immediately to the person in charge; or
 - (2) if the defect in his opinion is not likely to be the cause of danger or a significant reduction in the reliability or efficiency of the equipment, report the defect as soon as reasonably practicable to the person in charge.
24. Where an employee reports a defect in equipment to the person in charge in accordance with paragraph 23 (1), the employee shall not enter the hazardous confined space until the equipment has been repaired or the person in charge declares that the equipment is safe to use, whichever is the earlier.

Compressed Air

25. Compressed air used for breathing apparatus shall comply with Canadian Standards Association standard "Purity of Compressed Air for Breathing Purposes" Z.180.1-1973 and amendments thereto, or with a standard recommended by Health and Welfare Canada or Labour Canada.

General Requirements

1. A health unit may be established where a group of more than 750 employees on any one shift is concentrated in an area where such employees would have convenient access to a centrally located health unit. The installation of a health unit to service a lesser number of employees may be considered in certain circumstances, according to the location, type and hazards of the work, and other variable factors. Health and Welfare Canada, through its Regional Medical Services Offices, will maintain a continuous appraisal of potential health unit requirements, and make recommendations to the Treasury Board in this regard.
2. Where a Regional, Zone or Area Medical Services facility of Health and Welfare Canada is accessible to groups of employees, such facility will undertake to provide health unit and health counselling services to such employees.

Location and Facilities

3. The Department of Public Works* is responsible for the provision of the required space for an approved health unit installation, and for the provision of adequate services (heat, light, water, etc.) as specified in this Standard. Prior to undertaking the construction or provision of such space, Public Works will consult with the Medical Services Branch of Health and Welfare Canada, at Ottawa, or the nearest Regional Director of Medical Services, concerning the proposed site, the layout of space and the facilities to be installed.
4. In situations where a health unit is installed to service a group of employees located in separate buildings in an area, the health unit should be so located that the average distance from the work places of all the groups of employees to be served, is as short as possible.
5. A health unit should be located in a conveniently accessible and central location within a building, preferably near a passenger elevator, in order to facilitate handling accident or stretcher cases. The location should be free of irritating noise, dust, odors and vibrations. Doorways should be at least 36" (90 cm) wide to accommodate stretchers and wheelchairs.
6. Proper ventilation, illumination, heating, telephone communications, water and toilet facilities, are to be provided.

*Departments having the control and management of their own space and facilities are required to assume the functions assigned in this Standard to the Department of Public Works.

7. The location of the health unit should be identified through the provision of appropriate signs and directions, both at the unit, and throughout the area served.

Space Requirements

8. Total health unit space should be provided on the basis of 625 square feet (56.25m^2) for the first 750 employees served, and an additional 25 square feet (2.25m^2) for each 50 additional employees. Such space will include the following:

Waiting Room

- (1) Each waiting room should contain adequate waiting spaces and furnishings for four (4) persons for each 750 employees served. The layout should allow sufficient space to permit the turning of a stretcher for entrance into the treatment room and quiet rooms.

Treatment Rooms

- (2) Treatment rooms should contain adequate lockable cupboard space, a suitable wall cupboard over the sink, and counter space.

Counselling Offices

- (3) A counselling office will be provided for each nurse. Such offices should be as soundproof as possible, immediately accessible to the waiting room and contain built-in book shelves or a bookcase.

Quiet or Rest Rooms

- (4) Two quiet rooms will be installed in each health unit, each with space for two cots. Overhead tracks should be installed with suitable curtains to surround each cot.

Washroom and Toilet Facilities

- (5) These facilities should be located adjacent to the treatment room wherever possible.

Storage Space

- (6) A separate storage area with built-in shelving for linen supplies, etc., will be provided.

Furnishings and Equipment

9. Medical furnishings, supplies and equipment shall be supplied by Health and Welfare Canada. Other furnishings shall be supplied by the department receiving service from the health unit. Where more than one department is served, co-operative arrangements for the supply of furnishings may be made between the host departments. A list of furnishings, supplies and equipment is contained in Table I.

Nursing Counsellors

10. A qualified nursing counsellor will be in charge of each health unit. Additional nursing personnel may be assigned where necessary, to staff a health unit in accordance with the scale of one nursing counsellor for each 750 employees on a shift. Where a lesser number of employees work on another shift, provision of nursing services may be considered for that shift, according to the requirements of each situation.
11. Where a group of temporary or casual employees is to be engaged for a period of two weeks or more and the addition of such staff in an area serviced by a health unit constitutes, according to this Standard, a requirement for an additional nurse, the department employing such temporary staff may, giving adequate notice, request Health and Welfare Canada to provide the temporary services of additional nursing personnel for the duration of such period.
12. The nursing personnel of each health unit will be appointed by Health and Welfare Canada and the nursing staff and health unit will operate under the exclusive direction and control of that department.
13. A nursing counsellor in charge of a health unit will be responsible for all aspects of its operation, and in this respect will report direct to the Regional, Zone or Area Director of Medical Services of the area in which the health unit is located. The role of the nursing counsellor is outlined in Table II.

Records

14. The provision, maintenance, use and interpretation of all records, forms and procedures as may be required in the operation of a health unit, and for nursing counsellor services, will be the responsibility of Health and Welfare Canada.

TABLE I

SUGGESTED LIST OF SUPPLIES AND EQUIPMENT FOR
PUBLIC SERVICE HEALTH UNITS

ITEMS PROVIDED BY HOST DEPARTMENT

Nurse's Office

Desk, double pedestal, 60" x 30" (150cm x 75cm).
Chairs (2), straight, without arm rests, upholstered.
Chair (1), straight, with arm rests, upholstered.
Cabinets, filing, letter size, 4 drawers with lock, (one for each 400 employees served) including 8 file compressors for each cabinet.
Costumer (1).
Fan, electric desk, (for non air-conditioned areas only).

Waiting Room

Settee(s), upholstered.
Table(s), end.
Chairs, with arm rests, upholstered.
Costumer.
Pamphlet Rack (specifications available from Medical Services Branch, Health and Welfare Canada).

Quiet Rooms

Chairs, straight, wooden, without arm rests.
Mirrors, wall.
Costumers.
Fan, electric desk (non air-conditioned areas only).

Treatment Rooms

Chairs, straight, wooden, without arm rests.
Fan, electric desk (non air-conditioned areas only).
Refrigeration Unit, 4.6 cu. ft. (0.138m³) capacity (approximately).

ITEMS PROVIDED BY HEALTH AND WELFARE CANADA

All medical supplies and equipment required for the operation of a standard health unit will be determined and provided by Health and Welfare Canada. A detailed list of such supplies and equipment is available from the Medical Services Branch of that Department.

Health units servicing operations having special health risks, such as laboratories, etc., may carry special additional supplies and equipment. Requests for the provision of such supplies will be made through the Medical Services Branch of Health and Welfare Canada.

TABLE II

THE ROLE OF THE PUBLIC SERVICE NURSING COUNSELLOR

MEDICAL SERVICES BRANCH, HEALTH AND WELFARE CANADA

The Public Service Nursing Counsellor fulfils a key role in the operation of the Public Service Health Program. The Counsellor's prime function is to undertake an active program of health counselling designed to foster in employees the knowledge to promote their own and their families' good health. Subjects which may be involved in such activities include personal health and hygiene, emotional health, problem drinking, nutrition, home food budgeting, recreation, home and family problems, maternal and child health, job adjustment and vocational guidance, excessive absenteeism and work environment. The nursing counsellor also provides an advisory service to departmental management in all matters concerning the occupational health and well being of employees.

The nurse is familiar with, and makes full use of community medical resources for the benefit of the employee, and may refer employees, where appropriate, to a personal physician, a Public Service Medical Officer, or to community agencies such as mental health services, child health agencies, family welfare, rehabilitation centres for alcoholism and drug abuse, etc.

The nurse participates, where required, in the local administration of environmental health programs, and may advise management concerning the need for supervision or control of occupational or environmental hazards which may come to attention. The nurse is also concerned with the general medical supervision of sanitary conditions, including the provision of advice and instruction to employees in proper food handling techniques, and is also prepared to participate in the activities of local safety committees.

Emergency medical and nursing care is provided by the nurse in cases of occupational illness and injuries. In other illnesses or injuries, limited medical care may be provided to employees until they can be treated by a personal physician. Other than the foregoing, the provision of special care and treatment may be considered if resources permit, upon written request from the employee's private physician.

The nurse may, where required, assist management in defining local requirements for provision of employees trained in first aid, in the selection of employees for such training, and in monitoring the qualifications and effectiveness of those administering first aid.

The Nursing Counsellor may assist with arrangements for, and participate in, the provision of employee medical examinations, and the immunization of employees prior to foreign duty, isolated posting, or other occasions. The nurse also participates in the planning, organization and implementation of special programs such as mass X-ray surveys or immunizations, promotes departmental arrangements for "return-to-work" interviews with employees following absences due to illness or injury, and with new employees reporting to work.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard

- (1) "machine guard" means a device that is installed on a machine to prevent a person, or any part of his body or clothing, from becoming engaged in any rotating, moving, electrically charged, hot or other dangerous part of a machine, or the material that the machine is processing, transporting or handling. It also means a device that makes the machine inoperative if a person or any part of his clothing is in or near a part of the machine that can cause injury;
- (2) "person in charge" means a qualified person appointed by management to supervise the safe and proper conduct of an operation or the work of employees;
- (3) "safety officer" means a person so designated by the Minister of Labour pursuant to Part IV of the Canada Labour Code.

General Requirements

3. To the extent it is reasonably practicable, departments should ensure that all machines used by employees are designed, constructed and installed so as to be safe without the use of removable machine guards.
4. Machine guards shall be installed on any machine or part of a machine that constitutes a source of danger to personnel, and shall be maintained in such a manner as to ensure safe and proper operation of the machine.
5. An employee shall not be permitted to operate, or perform any maintenance or repair work on a machine guard, unless he is qualified by knowledge, training and experience, and is authorized to do so.
6. Where a machine or a part thereof is equipped with a machine guard, the machine or a part thereof shall not be operated or used unless the machine guard is in its proper position, except in an emergency situation or following consultation with the appropriate Regional Director of Labour Canada.

Repair and Maintenance of Machines

7. Where a machine or part thereof has a machine guard that must be removed from its protective position in order to perform repair or maintenance work, such work may not proceed unless the machine or part thereof has

been made inoperative, and the work is performed in accordance with a lock-out procedure, i.e., a written procedure approved by the person in charge, that will ensure that the machine cannot be operated or energized without the knowledge and consent of the person performing the repair or maintenance work on the machine where such work would expose that person to danger.

8. Where a machine or a part thereof has a machine guard described in paragraph 7, and it is not reasonably practicable to render the machine or the part inoperative in order to perform repair or maintenance work, such work may be performed on the machine if
 - (1) the person performing such work follows a special written procedure that is consistent with good industrial safety practice, and which will ensure that the danger to the safety of that person is not significantly greater than it would be if the machine or part thereof had been rendered inoperative; and
 - (2) prior to the performance of such work, written authority is obtained from the person in charge; and
 - (3) such work is performed in the presence of and under the direct supervision of the person in charge, or a qualified person authorized by the person in charge.
9. Departments should ensure that a copy of every written procedure referred to in paragraphs 7 and 8 is readily available to persons who repair and maintain machines, and for examination by a safety officer.

Standards for Machine Guards

10. Every machine guard is to be designed, constructed, installed, operated and maintained in accordance with a standard set out in the attached Table or a standard that follows good industrial safety practice. In the latter case, Departments should seek the advice of the appropriate Regional Director of Labour Canada.

TABLE I
MACHINE GUARD STANDARDS

<u>Standard</u>	<u>Title</u>
(1) <u>Canadian Standards Association</u>	
a) CSA Z142-1976*	"Code for the Guarding of Punch Presses at Point of Operation"
b) CSA Z114-1977*	"Safety Code for the Woodworking Industry"
c) CSA B.173.5-1972*	"Safety Code for Use, Care and Protection of Abrasive Wheels"
(2) <u>American National Standards Institute, Inc.</u>	
ANS B15-1-1953 (R1958)*	"Safety Code for Mechanical Power-Transmission Apparatus"
(3) <u>Her Majesty's Factory Inspectorate</u> (Safety, Health and Welfare Booklets)	
a) New Series No. 3*	"Safety Devices for Hand and Foot Operated Presses"
b) New Series No. 11*	"Guarding of Hand-Fed Platen Machines"
c) New Series No. 12*	"Drop-Forging Hammers, Props and Catches"
d) New Series No. 14*	"Safety in the Use of Mechanical Power Presses"
e) New Series No. 20*	"Drilling Machines"
f) New Series No. 33*	"Safety in the Use of Guillotines and Shears"
(4) <u>National Safety Council</u>	
Accident Prevention Manual (7th Edition)*	

* As amended from time to time

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard

- (1) "Act" means Part IV of the Canada Labour Code;
- (2) "maximum safe load", with respect to any materials handling equipment or any floor, dock or other structure used in handling materials, means
 - (a) the maximum load that such equipment or structure was designed and constructed to handle or support safely; or
 - (b) the maximum load that such equipment or structure is guaranteed or specified in writing by the manufacturer to handle or support safely, whichever is the lesser;
- (3) "materials handling equipment" means any machine, equipment or mechanical device used when transporting, lifting, moving or positioning any materials, goods, articles, persons or things and includes any crane, derrick, loading tower, powered industrial truck, handtruck, conveyor, hoist, earth-moving equipment, rope, chain, sling, dock, ramp, storage rack, container, pallet and skid; but does not include elevating devices that are subject to the Elevating Devices Safety Standard, TB STD 3-4, or tools that are subject to the Hand Tools and Portable Power Tools Safety Standard, TB STD 3-6;
- (4) "Minister" means the Minister of Labour;
- (5) "mobile equipment" means any materials handling equipment described in paragraph 3 that is self-propelled, or in respect of which mobility is the predominant characteristic;
- (6) "motor vehicle" means a truck, tractor, trailer, semi-trailer, automobile, bus or other similar self-propelled vehicle used primarily for transporting personnel and/or material;
- (7) "operator" means a person who has the qualifications described in paragraph 5 and who has been designated to operate or assist in the operation of materials handling equipment;

- (8) "person in charge" means a qualified person appointed to supervise the safe and proper conduct of an operation or of the work of employees;
- (9) "qualified person" means a person who, because of knowledge, training and experience, is qualified to perform safely and properly, a specified job;
- (10) "safety officer" or "regional safety officer" means a person so designated by the Minister of Labour pursuant to Part IV of the Canada Labour Code;
- (11) "signal man" means a qualified person designated by a person in charge to direct, by means of hand, voice or other signals, the safe movement or operation of materials handling equipment;
- (12) "standard code of signals" means a code of signals that
 - (a) is adopted by a department for use by all employees in directing the safe movement or operation of materials handling equipment; and
 - (b) complies with the code of signals recommended by the National Safety Council or by the American National Standards Institute.

General Responsibility of Departments

- 3. Departments shall ensure, to the extent that is reasonably practicable, that all materials handling equipment, floors, docks or other structures that are operated or used for handling materials
 - (1) are suitable and safe for the purposes for which they are operated or used;
 - (2) are maintained in a safe operating condition; and
 - (3) comply with this Standard.
- 4. The operator of any materials handling equipment shall have ready access to such operating manuals as may be necessary for the safe and proper operation of the materials handling equipment. The operator shall also have access to relevant maintenance schedules and will ensure that, where required, operator maintenance is performed according to such schedules.
- 5. Every operator shall be
 - (1) appropriately trained, instructed and tested in the safe and proper use of the applicable materials handling equipment, and be familiar with departmental safety directives;

- (2) physically fit to safely operate materials handling equipment; and
 - (3) familiar with the highway vehicle laws of every province and territory within which mobile equipment is operated during the course of employment.
- 6. A record shall be maintained of any training and instruction provided pursuant to paragraph 5 (1).
 - 7. Subject to paragraph 76, no employee shall be permitted to operate or assist in the operation of any materials handling equipment unless the employee has either been authorized as an operator, or is an employee engaged in maintaining or repairing materials handling equipment and is required under the authority of the person in charge to operate such equipment for purposes of testing, ascertaining fault or verifying repairs.
 - 8. Where, in the opinion of a Labour Canada Regional Director, a code, procedure or practice referred to in this Standard, or utilized by a department, does not provide a sufficient degree of safety or may be otherwise inappropriate, the Director may, in accordance with the procedures outlined in the Occupational Safety Policy for the Public Service, make recommendations to departments concerning the specific safety procedures or codes to be followed in the circumstances. Departments may obtain information and/or advice concerning good industrial safety practice or applicable safety codes or procedures by contacting the appropriate Regional Office of Labour Canada.

General Responsibility of Employees

- 9. Every operator shall operate any materials handling equipment assigned in the manner in which the operator was trained and instructed as stipulated in paragraph 5 (1).
- 10. No operator shall operate any materials handling equipment in a careless or reckless manner or otherwise endanger his or her safety or that of other employees.
- 11. No operator shall operate or use any materials handling equipment from which a machine guard or other safety device has been removed or rendered ineffective except in accordance with the Machine Guarding Safety Standard, TB STB 3-9.
- 12. No employee shall interfere with the safe operation of any materials handling equipment.
- 13. No employee shall remove or render ineffective a machine guard or other safety device with which any materials handling equipment is fitted except with the express approval of the person in charge.

Design and Construction of Materials Handling Equipment

General

14. Materials handling equipment required to be operated or used by an employee shall be designated, constructed, operated and used in a manner such that
 - (1) the equipment will perform safely under the severest conditions of its operation and use that are likely to be encountered;
 - (2) to the extent that is reasonably practicable, all parts of the equipment that are subject to failure are so designated that, if a failure occurs, it will not result in a loss of control of the equipment or otherwise create an unsafe condition;
 - (3) all glass in doors, windows and other parts of the equipment is safety glass that will not shatter into sharp and dangerous pieces under impact;
 - (4) any equipment employed directly in the loading and unloading of ships complies with the Tackle Regulations made under the Canada Shipping Act; and
 - (5) it conforms to the applicable requirements of the Canada Motor Vehicle Safety Standards prescribed by Transport Canada.

Protection from Falling Objects

15. Where materials handling equipment is used under such circumstances that the operator may be struck by a falling object or shifting load, the materials handling equipment shall be provided with a protective cab, roof, screen, bulkhead or guard of a design, construction and strength that will prevent, under all foreseeable conditions, the penetration of the object or load into the area occupied by the operator.
16. A protective device referred to in paragraph 15 shall be
 - (1) fabricated from non-combustible or fire resistant material; and
 - (2) designed to permit quick exit from the materials handling equipment in an emergency.
17. Paragraph 15 does not apply where a protective device referred to therein would interfere with the effective operation of the materials handling equipment and a procedure or method is used that, in the opinion of the person in charge, will protect the operator from a falling object or shifting load.

Protection from Turnover

18. Where mobile equipment is likely to turn over under any circumstances of its use, it is to be fitted with roll-over bars or a similar protective device that will prevent the operator of the mobile equipment from being trapped or crushed under the equipment if it does turn over.

Fuel Tanks

19. Any fuel tank, compressed gas cylinder or similar container of a dangerous substance that is mounted on any materials handling equipment is to be
 - (1) located or protected so that, under all conditions, it constitutes a minimal hazard to any employee who is required to operate or ride on that equipment and, in the case of a fuel tank, is separated from the operator by an adequate protective shield or partition;
 - (2) connected to fuel overflow and vent pipes that are located so that fuel spills and vapours cannot be ignited by hot exhaust pipes or other hot or sparking parts, or otherwise endanger the safety or health of any employee who is required to operate or ride on that equipment; and
 - (3) labelled on servicing caps or covers as to the contents of each tank.

Protection from Elements

20. The operator of any materials handling equipment regularly used out-of-doors is to be protected from exposure to any condition that will, in the opinion of the person in charge, jeopardize safety or health.
21. Where the temperature in the operator's compartment or position on any materials handling equipment is, as a result of heat coming from or associated with the equipment, normally and consistently above 80°F (26°C), the operator shall, to the extent that is reasonably practicable, be protected from the heat by an insulated barrier or some other effective means.

Vibrations

22. All materials handling equipment operated by any employee is to be so designed and constructed that the operator will not be injured, or control of the equipment be impaired, by any vibrations, jolting or uneven movements of the equipment under normal operating conditions.
23. Any protection provided in accordance with paragraph 22 shall, to the extent that is reasonably practicable, be an intrinsic part of the design and construction of the materials handling equipment.

Controls

24. The arrangement and design of dial displays and controls, and the general layout and design of the operator's compartment or position on all materials handling equipment shall
- (1) contribute to the safe operation of the materials handling equipment; and
 - (2) not hinder or prevent the operator from operating the materials handling equipment in accordance with good industrial safety practice.

Fire Extinguishers

25. Fire extinguishers are to be provided in accordance with Fire Protection Engineering Standards published by the Dominion Fire Commissioner.

Means of Entry or Exit

26. All materials handling equipment operated or maintained by an employee is to be provided with a safe means of entry into and exit from
- (1) the compartment or position of the operator; and
 - (2) any place on the equipment in which an employee must be positioned in order to service the equipment.

Tool Boxes

27. Tools, materials or parts carried on any materials handling equipment shall be stored in a tool box or other secure and safe place where they will not endanger the operator or any other person.

Lighting

28. Where any mobile equipment is operated or used by an employee at night, or in areas where the illumination level within the area of operation of the equipment is less than one foot candle (one decalux), the mobile equipment is to be
- (1) fitted on the front and rear thereof with warning lights that are visible at night from a distance of not less than three hundred feet (one hundred metres); and
 - (2) provided with general illumination sufficient to ensure the safe operation of the equipment under all conditions of use.
29. Where the general illumination referred to in paragraph 28 (2) is provided by lighting facilities on the mobile equipment, the lighting facilities shall comply with paragraphs 30 and 31.

30. Notwithstanding paragraph 28, no operator shall operate any mobile equipment at night on a road that is used by other vehicles unless it is equipped with such lighting facilities for mobile equipment as are prescribed by the laws of the province or territory in which the equipment is operated.
31. Where lighting facilities for mobile equipment are not prescribed by a law of the province or territory in which the equipment is operated, the lighting facilities on that equipment shall comply with Canadian Standards Association standard Vehicle Lighting Equipment, D106-1-1972, as amended from time to time, or such other standard recommended by Labour Canada.

Slow Moving Vehicles

32. Mobile equipment operated at a rate of speed that is more than twenty miles per hour (thirty kilometres per hour) below the posted speed for the road or area being utilized, shall be equipped with a slow moving vehicle warning device as prescribed by the laws of the province or territory in which the equipment is operated.
33. Where the laws of the province or territory in which the mobile equipment is operated do not prescribe a slow moving vehicle warning device, such mobile equipment shall be equipped with a warning device in accordance with Canadian Standards Association standard Slow Moving Vehicles Warning Device, D198-1967, as amended from time to time.

Safe Loads

34. Materials handling equipment shall not be operated or used with a load that is in excess of its maximum safe load.
35. The failure of any materials handling equipment due to overloading may create an unsafe work condition; therefore
 - (1) the maximum safe load of that equipment shall be clearly marked on the equipment or on a label securely attached to a permanent part of the equipment in a position where the mark or label can be easily read by the operator, and such mark or label shall be maintained in a legible condition; and
 - (2) where appropriate, equipment shall be provided with a diagram securely attached to a permanent part of the equipment, showing the lift capacity at each attitude and length of the boom or other lifting member.
36. Notwithstanding paragraph 35, the labelling of chains, ropes and slings may be waived if some other means of determining their safe loads is readily available to all employees required to use them, and procedures are adopted that will ensure that the safe loads are not exceeded.

Control Systems

37. All mobile equipment that is operated or used is to be fitted with braking, steering and other control systems that
 - (1) are capable of safely controlling and stopping the movement of the mobile equipment and any hoist, bucket or other part thereof; and
 - (2) respond positively, reliably and quickly to moderate effort on the part of the operator.
38. Where, in the opinion of the responsible departmental officer, it is necessary for safety,
 - (1) power-assisted systems are to be provided for the braking, steering or other control systems of the mobile equipment; and
 - (2) an alternate power source for braking and steering is to be provided on equipment that cannot be controlled safely by an operator in the event of engine failure.
39. Any mobile equipment frequently used for transporting employees as passengers from place to place on a work site is to be equipped with a mechanical parking brake as well as a hydraulic or pneumatic braking system.
40. Where any materials handling equipment has a moving part with a limit as to safe operating speed or safe travelling distance, an automatic control shall be provided for that part, where reasonably practicable, to prevent its speed or distance of travel, as the case may be, from exceeding that limit.

Starting Devices

41. Where it is reasonably practicable to do so, all mobile equipment that is operated or used shall be fitted with a power operated starting device.
42. No operator of any mobile equipment that is fitted with a power operated starting device shall use a hand crank to start the equipment unless the starting device fails.
43. When the starting device referred to in paragraph 41 fails, it shall be restored to service as soon as is reasonably practicable.

Warnings

44. Any mobile equipment that operates in any area occupied by employees is to be fitted with a horn or similar audible warning device, having a distinctive sound that can be clearly heard above the noise of the equipment and any surrounding noise. Where audible warning devices do not provide adequate warning, visual flashing signals such as strobe lights shall be used.

Seat Belts

45. Any mobile equipment, operated or used under conditions where safety seat belts or shoulder type restraining devices are likely to contribute to the safety of the operator, shall be fitted with such seat belts or device.
46. The safety seat belts referred to in paragraph 45 shall comply with Canadian Standards Association standard Seat Belt Assemblies for Passenger Cars, Multipurpose Passenger Vehicles, Trucks and Buses, D159.1-1972, as amended from time to time.
47. Every employee, while travelling on any mobile equipment that has been fitted with safety seat belts or a shoulder type restraining device, shall use or wear such seat belts or device.

Rear View Mirror

48. Where mobile equipment cannot be operated safely unless the operator has a clear view of the area behind the vehicle or equipment, such vehicle or equipment is to be equipped with sufficient mirrors to provide a clear view of the rear.

Electrical Equipment

49. Any electrically powered materials handling equipment shall be so designed and constructed that the operator or any other person will be protected from electrical shock or injury by means of securely fastened protective guards, screens or panels.

Automatic Equipment

50. Any mobile equipment, controlled or operated by a remote or automatic system, and used in any place where it may make dangerous contact with any employee, is to be prevented from making such contact, to the extent that is reasonably practicable.
51. Where it is not reasonably practicable to comply with paragraph 50, at every dangerous intersection or place along the roadway or path of travel of any mobile equipment referred to therein, the safety of employees is to be protected by an alarm system, an emergency stop system and protective barriers.

Docks and Ramps

52. Every loading and unloading dock, platform and ramp used by any employee is to be
 - (1) of sufficient strength to support, without failure, the maximum load to which it will be subjected;

- (2) generally free of surface conditions and irregularities that may interfere with the safe control of mobile equipment;
- (3) fitted, around any of its sides that are not used for loading or unloading, with side rails, bumpers or rolled edges of sufficient height and strength to prevent mobile equipment from running over the edge; or
- (4) used in a manner that will avoid mobile equipment from running over the edge.

53. Every portable ramp or dock plate used by any employee is to be

- (1) clearly marked or tagged to indicate its maximum safe load; and
- (2) provided with a means of attaching it firmly and securely in place, except where it is so designed that it cannot slide, move or otherwise be displaced under the load that it is required to support.

54. Paragraph 53 (1) does not apply where

- (1) some means of establishing the safe load of a portable ramp or dock plate, other than that described in that paragraph, is available to all employees required to use such ramp or plate; and
- (2) procedures are adopted which will prevent the maximum safe load of the portable ramp or dock plate from being exceeded.

55. No operator shall operate or be permitted to operate any mobile equipment on a ramp with a gradient in excess of

- (1) the gradient that is recommended as safe for that type of ramp by the manufacturer of the mobile equipment, either loaded or unloaded, as applicable;
- (2) such lesser gradient as is safe in the opinion of the person in charge, with regard to the mechanical condition of the mobile equipment and its load and traction.

Conveyors

- 56. Each conveyor, cableway or other similar materials handling equipment that is operated, used or serviced by any employee is to be designed, constructed, operated and maintained in accordance with American Society of Mechanical Engineers standard B20.1 (1957), as amended from time to time, or with a standard recommended by Labour Canada.
- 57. Where a conveyor, cableway or other similar materials handling equipment crosses a roadway or walkway at ground or floor level, and there is a danger that such equipment could come into contact with a person or a

vehicle, a safe passageway for such person or vehicle, as the case may be, is to be provided.

58. Where a conveyor, cableway or other similar materials handling equipment crosses above a roadway, walkway or work area used by employees, the equipment is to be so guarded that material from the equipment cannot fall on any person or vehicle passing underneath it.
59. Where a "go-slow" sign, restricted clearance sign or other warning sign is placed at a conveyor cross-over for the safety of employees, the approaches to such a cross-over shall be clearly marked at a safe distance from the cross-over with an appropriate warning sign.

Clearance

60. Subject to paragraphs 63 and 64, the person in charge shall ensure, on any route that is regularly travelled by mobile equipment operated or used by any employee, that clearances are provided that comply with paragraph 61.
61. Every clearance referred to in paragraph 60 shall
 - (1) in the case of an overhead clearance, be at least six inches (150 mm) above that part of the mobile equipment or its load that is highest when the mobile equipment is in its highest operating position at the point of clearance; and at least six inches (150 mm) above the top of the head of every employee authorized to ride on the mobile equipment, when the employee is occupying the highest position at the point of clearance; and
 - (2) in the case of a side clearance, be adequate to permit the mobile equipment and its load to be manoeuvred safely by an operator, but in no case less than six inches (150 mm) on each side measured from the farthest projecting part of the equipment or its load, when the equipment is being operated in a normal manner.
62. If an overhead clearance measured in accordance with paragraph 61 (1) is less than twelve inches (300 mm), the top of the doorway or object that restricts the clearance shall be marked with a distinguishing colour or mark; and the height of the passageway in feet (metres) shall be shown near the top of the passageway in letters that are not less than two inches (50 mm) in height and are on a contrasting background.
63. Paragraphs 61 (2) and 62 do not apply to
 - (1) any mobile equipment whose course of travel is controlled by fixed rails or guides;
 - (2) that portion of the route of any mobile equipment that is inside a railway car, truck or trailer truck, including the doorway of the car, truck or trailer truck and the warehouse doorway leading directly thereto; or

- (3) a load that is larger than that normally transported by mobile equipment, if such a load is transported infrequently and special precautions are taken to prevent contact with objects that might restrict the movement of the equipment.
64. Where it is not reasonably practicable to provide a clearance prescribed by paragraph 61 and, in the opinion of the person in charge, a lesser clearance would not be dangerous, such lesser clearance may be allowed.

Aisles and Corridors

65. Where an aisle, corridor or other course of travel which exceeds fifty feet (15 m) in length is a principal traffic route for pedestrians and mobile equipment, a clearly marked walkway not less than thirty inches (750 mm) wide shall be provided along one side of the route, for the use of pedestrians only.
66. Paragraph 65 does not apply where measures other than those described therein are adopted for the purpose of controlling traffic and protecting pedestrians, and such measures comply with good industrial safety practice.
67. Where an aisle, corridor or other course of travel that is a principal traffic route intersects another such aisle, corridor or course of travel and, in the opinion of a responsible departmental officer, such intersection is dangerous,
- (1) warning signs marked with the words "Dangerous Intersection - Croisement dangereux" or similar words in letters not less than two inches (50 mm) in height on a contrasting background are to be posted along the approaches to the intersection; and,
 - (2) to the extent that is reasonably practicable, every blind corner is to be provided with mirrors in such manner that an operator of any mobile equipment that is approaching the corner along one course of travel can see a pedestrian or vehicle approaching the intersection along the other intersecting course of travel.

Ropes, Chains and Slings

68. Subject to this Standard, the design and construction of any rope, chain or sling and of any fittings and attachments thereon that are used by any employee shall comply with the recommendations contained in the 7th Edition of the Accident Prevention Manual of the National Safety Council, as amended from time to time.
69. Notwithstanding paragraph 68, any steel wire rope intended for use as materials handling equipment by any employee shall comply with

- (1) the recommendations of the manual referred to in paragraph 68;
- (2) the recommendations of Canadian Standards Association standard, G4-1976, Steel Wire Rope for General Purpose and for Mine Hoisting and Mine Haulage, as amended from time to time; or
- (3) any other standard recommended by Labour Canada.

Operation, Use and Maintenance of Materials Handling Equipment

Inspections and Checks

70. Before any materials handling equipment is operated or used for the first time, it is to be inspected and tested by a qualified person in accordance with the requirements of the department and the operating and maintenance manuals for that equipment, to determine, to the extent that is reasonably practicable, whether it is in a safe operating condition and is suited to the purpose for which it is to be used.
71. Following the inspection and test referred to in paragraph 70, a safety and maintenance check of all materials handling equipment is to be made by a qualified person as frequently as is necessary to ensure the safe operation of the equipment.
72. Where, in the opinion of a responsible departmental official, good safety practice requires that a safety and maintenance check schedule is to be provided and maintained for all materials handling equipment, such schedule shall be compiled and shall show
 - (1) the equipment checked;
 - (2) the date of the check;
 - (3) the nature of the check; and
 - (4) the maintenance work performed on the equipment.
73. A copy of each schedule referred to in paragraph 72 shall be retained on file for at least one year at the location where the materials handling equipment is maintained and shall be readily available for examination.
74. Every operator who has been assigned any materials handling equipment shall, immediately before placing that equipment in operation for the first time on a shift, make a visual inspection of that equipment and such other inspection of it as may be directed by the person in charge in order to ensure, to the extent that is possible from such inspection, that the equipment is safe for operation.
75. Every operator referred to in paragraph 74 shall, as soon as is reasonably practicable, report and document in writing to the person in

charge, any defect or condition in any materials handling equipment that is believed will affect the safe operation of the equipment that is required to be operated and if any such defect or condition constitutes imminent danger, the operator shall not operate the materials handling equipment until it has been examined by the person in charge and been declared to be safe to operate.

Operators

76. For the purpose of training, an employee who is not an operator may be permitted to operate materials handling equipment if that employee is accompanied by a qualified operator who can take over control of the equipment in the case of an emergency.
77. An operator who, in the opinion of the person in charge, appears to be suffering from a physical condition that may suddenly incapacitate him or her, or appears to have some other disability that may affect the ability to safely steer or otherwise safely operate the materials handling equipment that has been assigned, shall not be permitted to operate the materials handling equipment until it has been determined through a medical assessment arranged in accordance with the Periodic Health Evaluations Standard, TB STD 3-13, that the operator is free of any condition or disability which would render him or her incapable of operating that equipment safely.
78. If a law of the province or territory requires that the operator of a certain type of materials handling equipment possess an operator's licence, no operator shall operate or be permitted to operate that type of materials handling equipment unless he or she possesses the operator's licence required by that law.
79. Paragraph 78 does not apply in respect to an operator who has successfully passed an appropriate competency test, conducted by or on behalf of a department and is in possession of a valid permit or authority issued by the department to operate the equipment for which he or she was tested, providing such operation is restricted to the department's premises.
80. Subject to paragraph 79, no operator shall operate any mobile equipment from other than the operator's regular position, or another position designed specifically for that purpose.
81. Mobile equipment may, however, be operated from a position other than one referred to in paragraph 80, where the control of the equipment and the view of the work area from that position is at least as good and as safe as from the operator's regular position on that equipment, and such position is approved by the person in charge.

82. Operators shall not operate any mobile equipment unless they
- (1) have a clear and unobstructed view of the work area and the course to be travelled; or
 - (2) are under the direction of a signal man and have the approval of the person in charge.

Repair

83. The results of any repair, modification or replacement of a part of any materials handling equipment that is operated or used by any employee shall not decrease the safety factor and integrity of the equipment or part.
84. If a part of lesser strength or quality than the original part is used in the repair, modification or replacement of a part of any materials handling equipment, the use of the equipment is to be restricted to such loading and use as will ensure the retention of the original safety factor and integrity of the equipment or part.
85. For the purposes of paragraphs 83 and 84, "integrity" means the ability of any materials handling equipment or part thereof to retain all of those qualities that are essential to its safe and reliable performance.

Combination of Equipment

86. Mobile equipment shall not be operated or used in an assembly or a combination with other materials handling equipment, unless the safety of that assembly or combination is at least equal to that required by this Standard for the separate parts of the assembly or combination in respect of braking, steering and general operating control and safety.

Passengers

87. Subject to paragraph 88, unless authorized by the person in charge, no employee other than the operator and his or her assistants shall ride or be permitted to ride on any mobile equipment or any part thereof, or on any material transported thereon unless the mobile equipment is specifically designed for the transport of passengers.
88. A trainee operator or a person inspecting or testing any mobile equipment may accompany the operator if a secure seat or other safe place is provided on the mobile equipment.

Loading and Maintenance While in Motion

89. No employee shall pick up from, or place upon, any mobile equipment, any materials or supplies while the mobile equipment is in motion unless the mobile equipment is specifically designed for that purpose.

90. Except in the case of an emergency, no employee shall get on or off any mobile equipment while it is in motion.
91. No employee shall perform any repairs, maintenance or cleaning work on any materials handling equipment while it is being operated, except on those fixed parts of the equipment that are so isolated or protected that the operation of the equipment does not affect the safety of the employee performing the repairs, maintenance or cleaning work.

Starting Precautions

92. No employee shall start the power unit of any materials handling equipment until all drive clutches have been disengaged, all brakes set and the operator is assured that no person will be endangered by the starting of the power unit.
93. Where the power unit of any materials handling equipment operated or used by any employee cannot be started from the operator's position, specific procedures or safeguards are to be employed that will prevent the accidental movement of the equipment during the starting of the power unit.

Unattended Equipment

94. Subject to paragraphs 95 and 96, all mobile equipment that is operated by any employee is to be shut down during any period that it is unattended.
95. Subject to paragraph 96, where it is not reasonably practicable to shut down any mobile equipment while it is unattended, the operator of the mobile equipment shall secure it against accidental movement by placing the transmission in neutral, and setting a parking or mechanical brake, blocking the wheels, or by using other measures approved by the person in charge.
96. Where, in any circumstances described in paragraph 95, any mobile equipment is left unattended on an incline, it shall be secured against accidental movement by setting the parking or mechanical brake and blocking the wheels.
97. No operator who is operating a crane, hoist or similar materials handling equipment shall leave any such equipment unattended other than in a condition of maximum stability, unless some other equally safe measure approved by the person in charge is taken to prevent the equipment from tilting.

Positioning and Securing Load

98. Where mobile equipment is travelling with a raised or suspended load, the operator shall ensure that the load is carried as close to the ground or floor level as good industrial safety practice and local conditions

permit, and in no case shall the load be carried at a point above the centre of gravity at which the loaded mobile equipment would become unstable.

99. No operator shall operate or be permitted to operate mobile equipment that is loaded in such a manner as to obstruct the view in the direction of travel.
100. No operator shall operate or be permitted to operate any materials handling equipment, unless the load that it is carrying is so secured that it cannot slide or move to a dangerous extent or be toppled or dislodged from the equipment under any normal condition of operation, including a sudden swerve or an emergency stop at the maximum speed authorized in each circumstance.

Housekeeping

101. The floor, cab and other occupied parts of any materials handling equipment that are operated or used by any employee are to be kept free of any grease, oil, materials, tools or equipment that might cause a fire hazard or an employee to slip or trip, or might otherwise interfere with safe operation of the equipment.

Parking

102. No operator shall park any mobile equipment in a corridor, aisle, doorway or other place where that equipment might interfere with safe movement of other equipment, materials or persons.

Danger Area

103. In this section, "danger area" means any area within which a crane, hoist, shovel or other readily mobile materials handling equipment or equipment with wide swinging booms or other similar parts, is operating and might injure any person.
104. The main approaches to any danger area are to be posted with suitable warning signs or shall be under the control of a signal man while operations are in progress.
105. No employee or other person shall enter or be permitted to enter a danger area while operations are in progress, unless that person is a safety officer, or an employee whose presence in the danger area is essential to the conduct, supervision or safety of the operations, or a person who has been authorized by the person in charge to be in the danger area.
106. If any person, other than a person referred to in paragraph 105, enters a danger area while operations are in progress, the person in charge shall ensure that operations in that area are immediately discontinued and are not resumed until that person has left the area.

107. Subject to paragraph 104, any materials handling equipment or part thereof that is operated or used shall not, because of the wide swing of its booms or overhead loads, or for any other reason, extend into any adjacent travelled or other occupied areas outside the danger area.
108. Where it is not otherwise reasonably practicable for an operator to avoid the extension of any materials handling equipment or any part thereof into areas outside the danger area, the person in charge shall ensure that barricades, overhead protection or other barriers are erected to prevent any such extension; or a signal man is provided to warn the operator when there is danger of any such extension outside the danger area.

Overhead Loading

109. No operator shall occupy the operator's position on any mobile equipment if, during the overhead loading or unloading by other equipment, the load must pass over the operator's position, unless that position is protected by an overhead shield or guard of sufficient strength to prevent injury to the operator in the event that the load accidentally falls on the mobile equipment.

Overhead and Underground Hazards

110. No operator shall begin or be permitted to begin the operation of any materials handling equipment in an area where there is a danger that it might contact an electrical cable, gas pipeline or other overhead or underground hazard unless the operator has been
- (1) warned of the presence of every such known hazard;
 - (2) instructed, in accordance with the best information available, concerning the exact location of every overhead or underground electrical cable, gas pipeline or other hazard in the immediate vicinity of the operation; and
 - (3) informed of the specified safety clearances that must be maintained with respect to any overhead or underground hazard in order to avoid contact with it.
111. Where the location of a hazard referred to in paragraph 110 cannot be determined with certainty, or the person in charge is unable to provide the safety clearances referred to in paragraph 110 (3), every electrical cable is to be de-energized and every pipeline containing a dangerous substance is to be shut down and drained before a digging or other operation involving the use of materials handling equipment commences within the area of possible contact with such a hazard.

Bumping Blocks

112. Where rear dumping mobile equipment is required to discharge its load at the edge of a sudden drop in grade level that is of sufficient depth to cause tipping to the mobile equipment, a suitable bumping block shall be installed, or a signal man or other means of signalling as approved by the person in charge is to be provided.

Fuelling

113. Materials handling equipment using flammable fuels shall be fuelled in accordance with requirements or standards prescribed by the Dominion Fire Commissioner.

Maximum Grades

114. No operator shall operate or be permitted to operate any mobile equipment on a gradient in excess of
- (1) the gradient that is recommended as safe by the manufacturer of the mobile equipment; or
 - (2) such lesser gradient that, in the opinion of the person in charge, is safe having regard to the mechanical condition of the mobile equipment, the weight of the load it is transporting and the condition of the roadway.

Signals

115. A copy of the appropriate standard code of signals shall be provided to each signal man and to all employees who may be required to obey or give such signals, and such employees are to be instructed, trained and tested in the use of the code.
116. A copy of the standard code of signals shall be filed and be readily available for examination by a safety officer.
117. Signals used to direct the safe movement or operation of any materials handling equipment are to be given only by a signal man.
118. No employee, other than a signal man, shall give signals to direct the movement or operation of any materials handling equipment; however, any person may cause a stop signal to be given in an emergency and any such signal shall be obeyed by an operator.
119. No signal man shall direct the movement or operation of any materials handling equipment, except in accordance with a standard code of signals.
120. No signal man shall be employed or occupied otherwise than as a signal man during the time that any mobile equipment under his or her direction is in motion or operation in an area where signals are required to be given.

121. Where, in any work area, signals are required for the safe direction of any mobile equipment, and it is not reasonably practicable to use visual signals, the person in charge shall ensure that a telephone, radio or other appropriate signalling device is installed and used.
122. No person shall use radio transmitting equipment for the purpose of transmitting signals in any area when such use might activate electric blasting equipment.
123. Before using a radio for the purpose of transmitting signals, the person in charge shall ensure, to the extent that is reasonably practicable, that another transmitting device within the vicinity will not interfere with reliable transmission of signals.
124. Every wire and cable used in a signalling system referred to in this section is to be protected against damage that is likely to interfere with the transmission of signals.
125. Any signalling device referred to in paragraph 121 that functions unreliably or improperly shall be immediately removed from service, and returned to service until it has been examined, repaired and tested by a qualified person, and found to be functioning properly.
126. Where a signalling device referred to in paragraph 121 functions unreliably or improperly and the operation of any mobile equipment cannot be safely directed by another means of signalling, the mobile equipment is to be shut down until the signalling device is functioning properly.
127. Every employee operating a defective signalling device shall, as soon as is reasonably practicable, report the defect to the person in charge.
128. Where the safety of any person is likely to be endangered by the unexpected movement of any materials handling equipment that is controlled by a signal, the signal man shall not give the signal to move until that person is properly warned or protected.
129. Where the operator of any materials handling equipment does not clearly understand a signal, he or she shall regard that signal as a stop signal.

Ropes, Slings and Chains

130. Any rope or sling, or any attachment or fitting thereon that is used by any employee should be used and maintained in accordance with the recommendations contained in the 7th Edition of the Accident Prevention Manual of the National Safety Council, as amended from time to time, or with a standard that conforms to good industrial safety practice.
131. Information and/or advice concerning good industrial safety practice or other safety procedures or codes concerning the use and maintenance of ropes, slings and chains may be obtained from the appropriate Labour Canada Regional Director.

132. No employee shall use or maintain any rope, sling or chain, except in accordance with the requirements prescribed under this section.

Manual Handling of Materials

133. Where, in the opinion of the person in charge, the manual handling of any material or object may endanger the safety or health of an employee, the person in charge shall ensure that the material or object is not so handled.
134. Employees who are regularly required to manually handle materials will be instructed in a safe method of handling such materials, and in any other work procedures related to that work and appropriate to the employee's physical capabilities.
135. Employees shall manually handle materials in conformity with a method and work procedure referred to in paragraph 134.
136. Each method and work procedure adopted pursuant to paragraph 134 for the manual lifting and carrying of loads in excess of one hundred pounds (45 kg) shall be set out in writing and that record shall be readily available for review by a safety officer or any employee to whom it applies.

Storage of Materials

137. Subject to this Standard, and all other applicable Public Service Safety Standards, all materials are to be stored in accordance with the recommendations contained in the 7th Edition of the Accident Prevention Manual of the National Safety Council, as amended from time to time, or with any standard that conforms to good industrial safety practice. They shall also be stored in accordance with the fire safety requirements of the Dominion Fire Commissioner.
138. All materials are to be placed and stored in such a manner that the maximum safe load-carrying capacity of the floor and any other supporting structure is not exceeded.
139. Materials that are stacked in piles shall be stacked in such a manner that the piles do not
- (1) create a hazard by interfering with the distribution of light;
 - (2) obstruct or encroach upon passageways, traffic lanes or exits;
 - (3) impede the safe operation of materials handling equipment;
 - (4) obstruct the ready access to, and the use and operation of, fire fighting equipment;

- (5) interfere with the proper operation of sprinklers and other fixed fire protection and prevention equipment and devices;
 - (6) endanger the safety and health of any employee; and
 - (7) conceal any warning signs or symbols.
140. All materials are to be stored in such a manner that they will not collapse, fall, slip, topple or otherwise endanger employees who are stacking or removing materials or working in the storage area.

General

141. Where a person in charge, or other responsible departmental official, is informed in writing by a Labour Canada Regional Director that any materials handling equipment, floor, dock or any other structure may not be safe for any reason, the person in charge, or official, shall ensure that the maximum safe load or other operating restrictions in respect to the equipment, floor, dock or other structure is determined by a qualified person and one copy of the report of such determination shall be submitted to the Labour Canada Regional Director.
142. Any safety restriction or revised safe load limits shall continue in force until the original safety of the equipment or other facilities is restored.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Purpose

2. This Standard outlines the requirements for the safe operation of motor vehicles owned or leased by Public Service Department and Agencies, to ensure the safety of employees and the public, and to avoid property or equipment damage.

Definitions

3. In this Standard
 - (1) "motor vehicle" means a truck, tractor, trailer, semi-trailer, automobile, bus or other similar self-propelled vehicle used primarily for transporting personnel and/or material;
 - (2) "motor vehicle operator" is any employee who is required to operate a motor vehicle in the performance of his or her duties;
 - (3) "motor vehicle accident" is an event involving the operation of a motor vehicle which results in injury to persons and/or damage to equipment or property.

General Responsibilities

4. Departments and agencies shall be responsible for
 - (1) developing appropriate departmental rules and procedures for the safe operation of motor vehicles, in accordance with the general principles set forth in this Standard;
 - (2) analyzing and evaluating motor vehicle accident reports and statistics, determining the causes of accidents and utilizing this information to prevent additional accidents from similar causes;
 - (3) ensuring that every motor vehicle is maintained in a safe operating condition;
 - (4) ensuring that every motor vehicle operator is qualified in all respects to operate the vehicle to which he or she is assigned;
 - (5) enforcing safe driving rules and traffic regulations on premises and in operations under their control;

- (6) co-operating with civil authorities in the enforcement of traffic laws and the observance of safe practices; and
- (7) ensuring that employees are fully informed of the correct procedures to be followed in the event of an accident.

Safe Operation of Motor Vehicles

5. The operation of motor vehicles in an unsafe condition is prohibited. A motor vehicle is unsafe when any defect exists which, in the judgement of the responsible supervisor in consultation with an authorized motor vehicle mechanic, could contribute to an accident. A motor vehicle operator shall not be required to operate a mechanically unsafe vehicle or a vehicle loaded in a hazardous manner.
6. All motor vehicles, including emergency motor vehicles such as ambulances, shall be operated in a prudent manner and at speeds compatible with road, traffic, weather and visibility conditions, and in compliance with the appropriate federal, provincial, territorial or municipal laws.

Hazardous Movement

7. Prior to the movement of oversize or overweight motor vehicles, or those carrying dangerous articles or equipment over public highways, notification of the route and the utilization of public bridges, tunnels and/or highways is to be given to appropriate civil officials.

Medical Examination of Motor Vehicle Operators

8. Persons whose primary function is the operation of a motor vehicle are required to undergo periodic health examinations in accordance with the Periodic Health Evaluations Standard, TB STD 3-13.

Qualification of Motor Vehicle Operators

9. Every motor vehicle operator shall possess a valid licence to operate the motor vehicle to which he or she is assigned in accordance with the appropriate provincial or territorial law, or as may be otherwise required by regulations or statutes applicable to the Public Service.
10. In addition, motor vehicle operators may be required to demonstrate their competence to operate assigned motor vehicles and, in this regard, appropriate records should be maintained.

Training

11. Departments and agencies shall, where appropriate, institute or participate in motor vehicle operator training programs designed to provide

- (1) refresher training to acquaint personnel with changes in equipment or operating conditions; and
- (2) remedial training to offset specific weaknesses indicated by accident records, traffic rule violations or other instances of inadequate operating performance.

Investigation of Accidents

12. Every motor vehicle accident is to be investigated, the cause or causes determined and appropriate corrective action applied. Additionally, a supervisor's accident investigation report is to be completed in accordance with Procedures for the Investigation, Reporting and Recording of Accidents and Injuries, TB PROC 4-1.

Accident Rate

13. Departments and agencies should compute an accident rate in accordance with paragraph 14 at least annually, and maintain a record of the cost of vehicle repairs or replacement as a result of accidents.
14. The accident rate is to be determined by multiplying the number of motor vehicles involved in accidents by a constant of 100,000 miles (kilometres) and dividing by the number of miles (kilometres) operated for the period. The formula is shown in the example below:

Number of vehicles involved in accidents (23) x 100,000	=	Vehicle Accident Rate
Miles (kilometres) operated (2,416,407)		(0.95)

Note: If the same motor vehicle is involved in more than one accident during the period for which the accident rate is being computed, it shall add to the total "Number of vehicles involved in accidents" on each occasion. Hence, if one motor vehicle is involved in three accidents during the period, it is to be represented as three motor vehicles in the foregoing formula.

Motor Vehicle Servicing and Inspection

15. Each department and agency is responsible for ensuring that the servicing and inspection of its motor vehicles meet normal preventive maintenance and safety requirements commensurate with the use of motor vehicles, but in no case should the level of maintenance be less than the requirements outlined in the appropriate manufacturer's user manual.
16. At the start of each shift, each operator is to be responsible for carrying out a brief inspection of the motor vehicle assigned. Defects are to be reported promptly to the responsible supervisor.

Safe Transportation of Personnel

17. To the maximum extent possible, personnel are to be transported in passenger type motor vehicles such as sedans, station wagons and buses. The following safety rules governing passengers shall apply:
 - (1) only authorized personnel shall be permitted to ride in motor vehicles;
 - (2) the number of persons permitted to ride in a passenger motor vehicle must not exceed the seating capacity of that motor vehicle except when being transported locally for short distances in buses provided with handholds;
 - (3) personnel shall not be permitted to ride with any part of their person extended outside the motor vehicle, or on the running board, fender, cab, side or the tailgate of the motor vehicle, nor to board or alight from a motor vehicle while it is in motion.
18. When it is not possible or practicable to use passenger motor vehicles to transport personnel, truck type motor vehicles may be used. In such cases the additional safety measures listed below shall apply:
 - (1) fixed seating is to be provided and sideboards or stakes and tailgates fitted;
 - (2) the number of personnel to be transported may not exceed that for which fixed seating is provided;
 - (3) a suitable cover should be provided for protection from the elements;
 - (4) tools, equipment and cargo should be properly stowed and secured to prevent shifting in transit;
 - (5) the motor vehicle operator shall:
 - (a) brief personnel on safety requirements and appoint a person in charge of passenger conduct;
 - (b) release and lower the tailgate prior to the loading and unloading of passengers; and
 - (c) operate the motor vehicle with special caution relating to speed, road conditions, starting, stopping and turning.
19. Under special conditions, trucks without fixed seating may be used for transporting small groups (less than ten) for short distances on the department's premises. Passengers are to be in a secure position within the body of the truck, and the vehicle driven with extreme caution. If the use of a dump truck is authorized for such a purpose, the hoist controls are to be positively secured to prevent inadvertent operation.

Fire Prevention

20. No motor vehicle shall be operated unless it is entirely free of fuel leaks.
21. Motor vehicles are to be equipped with portable fire extinguishers where required, according to Fire Protection Engineering Standards published by the Dominion Fire Commissioner.

Motor Vehicle Fuelling

22. The following safety procedures and/or any other applicable procedures specified by the Dominion Fire Commissioner shall be followed during the fuelling of motor vehicles:
 - (1) motor vehicles are not to be fuelled indoors;
 - (2) only qualified personnel should be permitted to fuel motor vehicles;
 - (3) open flame, spark producing devices or smoking is not be allowed within 50 feet (15 m) of fuelling operations or areas;
 - (4) during fuelling, the engine of the motor vehicle must be stopped, the ignition and lights turned off, the parking or emergency brake applied, and the nozzle of the fuel hose kept in contact with the fuel intake pipe to prevent electrical arcing;
 - (5) when reserve supplies of fuel are to be carried on motor vehicles, they shall be carried in approved containers adequately secured and protected.
23. Tank trucks shall be loaded and unloaded in authorized areas by qualified personnel and under controlled procedures, in accordance with the Fire Protection Engineering Standards published by the Dominion Fire Commissioner.

Safety Measures Against Asphyxiation

24. The concentration of toxic exhaust fumes to which the operator and other persons are exposed when working on or near motor vehicles shall not exceed maximum levels as may be prescribed for the Public Service in applicable safety standards.

Motor Vehicle Safety Belts

25. Operators of, and passengers in, motor vehicles which are equipped with safety belts shall be required to fasten such safety belts in the approved manner at all times when the vehicle is in motion.

Highway Warning Devices

26. Motor vehicles operated on roads or in areas at speeds of more than 20 miles (30 km) per hour below the posted speed for the road or area, shall be equipped with a warning device as prescribed by the statutes of the province or territory in which the vehicle is operated, or in the absence of such requirements, in accordance with Canadian Standards Association standard Slow Moving Vehicle Warning Device, D198-1967, and amendments thereto.
27. In the event that a motor vehicle becomes disabled on or adjacent to the highway, advance warning devices such as flares or reflectors shall be placed in accordance with the statutes of the province or territory in which the vehicle is disabled.

First Aid Kits

28. Motor vehicles are to be equipped with first aid kits in accordance with the requirements of the First Aid Standard, TB STD 3-5.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Monitoring and Exposure

2. Safety officers designated by the Minister of Labour pursuant to Part IV of the Canada Labour Code, and environmental health officers of Health and Welfare Canada, will monitor noise levels and exposure to noise and, where necessary, give appropriate direction to departments and agencies, in accordance with the requirements of this Standard.

Measurement of Sound Levels

3. Sound level measurements shall be made with a sound level meter that complies with the American National Standards Institute standard S1.4-1971 for Type 2 "General Purpose" or Type S2A "Special Purpose" sound level meters, as amended from time to time.
4. Sound levels shall be determined by using the slow meter response and the "A" weighting scale of the sound level meter, or calculated by applying the "A" scale weighting factor to each octave band level of the sound, and combining those levels.

Maximum Noise Exposure

5. Subject to paragraphs 6 and 7, no employee shall be permitted to work where the sound level is more than ninety decibels.
6. Where it is not reasonably practicable to reduce the sound level at a work site to 90 decibels or less, employees may be permitted to work where they are exposed each day to
 - (1) a sound level set out in Column I of Table I for a number of hours or portions thereof not exceeding that specified in Column II of the Table for that sound level; or
 - (2) a number of different sound levels, each of which is set out in Column I of the Table, if the sum of the following ratios does not exceed unity (i.e., the ratios of the actual exposure time each day at each of those sound levels, to the maximum permitted exposure per day specified in Column II of the Table for each of those sound levels respectively).
7. Where it is not reasonably practicable to comply with paragraphs 5 or 6, employees may be permitted to work where they are exposed to sound levels

of more than ninety decibels if each employee is provided with and wears a hearing protector. The hearing protector must comply with the Canadian Standards Association standard Z94.2-1974, as amended from time to time, or with any other standard acceptable to Health and Welfare Canada, and it must reduce the sound reaching the ears of the wearer to a level below ninety decibels.

8. The requirements of paragraph 7 may be waived in respect to an employee working in a place where the noise level exceeds 90 but does not exceed 95 decibels, where a test of the employee's hearing level establishes that he can work without any permanent impairment of hearing, and provided the employee's hearing level is tested regularly.
9. Such tests shall be conducted in accordance with the requirements outlined in the Periodic Health Evaluations Standard, TB STD 3-13.
10. An employee shall not be permitted, at any time, to be exposed to impulse or impact sound which exceeds a peak sound pressure level of 140 decibels, unless appropriate approved hearing protection is being worn.

Noisy Survey

11. Where, in the opinion of a safety officer or an environmental health officer, employees in any work place are exposed to sound at levels that may impair their hearing, such officer should conduct a survey of the sound levels in that place, or require that a survey be conducted in accordance with the Procedures for Occupational Health Investigations and Surveys, TB PROC 4-2. Such officers may also require that employees, who have been subjected to sound levels that may impair hearing, be tested in accordance with paragraph 9.

Records

12. Departments should ensure that a record of every test or survey relating to noise control or hearing impairment is retained for at least five years, and is available for examination by a safety officer or an environmental health officer, or other authorized person.

Changes in Conditions

13. Departments are encouraged to notify the appropriate Labour Canada Regional Director of changes in any equipment, layout or work procedure that might significantly increase the exposure of any employee to sound levels exceeding those specified in this Standard.

Warning Signs

14. Departments shall post and maintain signs at the entrance to all work sites where the sound levels exceed ninety decibels, or where impact sound exceeds a peak sound pressure level of one hundred and forty decibels, warning persons entering those sites of the dangerous sound levels, the permissible length of exposure and, where hearing protectors are prescribed, of the requirement to wear such protectors.

TABLE I
MAXIMUM PERMITTED NOISE EXPOSURE AT A WORK SITE

<u>Column I</u>	<u>Column II</u>
<u>Sound Level in Decibels</u>	<u>Maximum Number of Hours of Exposure per Workday</u>
more than 87 but not more than 90	8
more than 90 but not more than 92	6
more than 92 but not more than 95	4
more than 95 but not more than 97	3
more than 97 but not more than 100	2
more than 100 but not more than 102	1.5
more than 102 but not more than 105	1
more than 105 but not more than 110	0.5
more than 110 but not more than 115	0.25
more than 115	0

Purpose

1. The purpose of a periodic health evaluation is to apply a screening procedure to certain occupational categories of personnel who, owing to an unrecognized illness or disability, may present a hazard to themselves or to others, or who may have some physical limitation which could affect their performance in a current or subsequent appointment. Such health screening is particularly required for persons employed in occupations hazardous to themselves or others; prior to each posting to isolated or foreign posts; and for other special purposes. The principal objective of these periodic health evaluations is to restrict, on a medical basis, employees from further exposure whenever warranted by the findings.

Application

2. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.
3. Periodic health evaluations shall be conducted for employees engaged in the occupations listed in Table I, Schedule of Periodic Health Evaluations, in accordance with that Schedule. Aircraft Pilots, Flight Navigators, Flight Engineers and Air Traffic Controllers, or other occupational categories referred to in Order in Council PC94/456 or equivalent subsequent regulations governing Physical Standards for Civil Aviation Personnel, are excluded.

Procedures

4. Employee health screening assessments or examinations, as designated in Table I, will be initiated by the employing departments and agencies according to the intervals specified therein, through the appropriate Regional Medical Services Offices of Health and Welfare Canada, utilizing the forms prescribed by that Department.
5. Such examinations or assessments will be carried out whenever practicable during normal working hours. Where an employee is required to travel to another location to undergo a medical examination or health screening, the employee will be considered in travel status, and reimbursement for such travel will be governed by the Treasury Board Travel Directive and/or the appropriate collective agreement.
6. Following a health screening or examination, a statement indicating the employee's physical suitability to perform his duties will be forwarded by the Regional Medical Services Office to the department concerned.
7. Where work limitations are identified as a result of health evaluation, the statement will incorporate appropriate recommendations concerning the

adaptation or selection of work, or the placement or reassignment of the employee, and the estimated duration of such limitations. In this regard, departments should, if possible, provide appropriate work for which the employee is physically qualified and is or can be trained to perform.

8. Each employee will be advised as soon as possible of the results of the health assessment. In the event that a medical examination affirms the existence of a health problem, the employee will be referred to his or her own physician for treatment.

Special Examinations

9. Departments may require special health examinations, where there is an environmental hazard to employees not covered by this Standard, or where, in the opinion of the responsible departmental official, an employee may have a health problem. Requests for such health evaluations should be submitted to the appropriate Regional Medical Services Office of Health and Welfare Canada.
10. Departments should ensure that the physical performance of an employee is monitored during the probationary period, and where work performance appears to be impaired due to matters related to the employee's health, a medical examination should be arranged with the appropriate Regional Medical Services Office to confirm the employee's physical suitability for continued employment.

Categories of Health Screening

11. Three basic health screening categories have been established, as outlined in Table II.

Physical Examination Standards

12. The establishment of physical examination standards applicable to the various occupational categories is the responsibility of Health and Welfare Canada.

Medical Confidentiality

13. All medical information, forms and records transmitted or used in connection with these health evaluations will be maintained in a confidential status, and retained within the medical community as authorized by Health and Welfare Canada.

TABLE I
SCHEDULE OF PERIODIC HEALTH EVALUATIONS

OCCUPATION	EXTENT OF HEALTH SCREENING	FREQUENCY
1. Employees engaged in food handling, preparation, processing or serving	<u>Category II</u> - including chest x-ray.	Annually
2. Hospital Employees	<u>Category II</u> - including chest x-ray.	Annually
3. (a) .Ships' officers .Marine Surveyors	<u>Category III</u> - including audiogram, chest x-ray, electrocardiogram, blood glucose, urinalysis.	Every 2 years to age 40 - annually thereafter.
(b) .Ship's crews .Ice observers	<u>Category III</u> - including urinalysis.	Every 2 years to age 40 - annually thereafter.
4. (a) .Bus drivers, .Heavy equipment operators .Crane operators .Hoist operators	A. <u>Category III</u> - including urinalysis, audiogram.	Every 2 years to age 40.
	B. <u>Category III</u> - As above, plus an annual electrocardiogram and chest x-ray every 2 years.	Annually over age 40.
(b) Other motor vehicle operators (Those whose position involves the full-time operation of a motor vehicle)	<u>Category III</u> - including urinalysis, audiogram.	Every 2 years
5. Radio operators	<u>Category II</u> - including audiogram.	Annually

6. Employees serving on detached field operations in remote areas.	<u>Category III</u> - including chest x-ray and dental examination. Also, inoculations for tetanus and in certain instances polio and typhoid, where required. (Initially, primary inoculation should be checked or performed, and annual boosters provided as required).	Annually (before proceeding on detached field operations).
7. Personnel directly employed in clinical activities including clinical laboratory work.	<u>Category II</u> - for some employees, such as microbiologists, immunization may be required.	Annually
8. .Animal keepers .Veterinarians .Primary Products Inspectors (health of animals)	<u>Category II</u> - including chest x-ray.	Annually
9. .Firefighters .Park wardens and trail crews	<u>Category III</u> - including pulmonary function test, electrocardiogram, chest x-ray.	Annually
10. Personnel exposed to lasers	<u>Category II</u> - plus an ophthalmological examination of lens, fundi, visual fields, visual acuity.	Annually
11. (a) X-ray workers or personnel working with other ionizing radiation emitting devices.	<u>Category III</u> - (Personnel Badge monitoring as required by the Radiation Protection Bureau)	When first appointed to duties involving the use of x-rays, or as required by the Radiation Protection Bureau of Health and Welfare Canada.

(b) Personnel working with radioactive isotopes.	<u>Category III</u> - (Personnel Badge monitoring as required by the Atomic Energy Control Regulations, or by the Radiation Protection Bureau)	When first appointed to duties involving the use of radioactive isotopes, as required by the Atomic Energy Control Regulations, or by the Radiation Protection Bureau.
12. Personnel working in hazardous noise areas.	<u>Category II</u> - including audiogram.	Every 6 months or at other intervals as determined by Health and Welfare Canada based upon exposure
13. (a) Personnel exposed to toxic materials, harmful dusts and chemical hazards. (Employees exposed to or handling lead, chromium, ammunition, cyanide, organic solvents, etc.)	Type of examination or screening is dependent on the type, extent and frequency of exposure and degree of hazard, and will be based primarily upon environmental monitoring, control and medical supervision by Health and Welfare Canada.	As determined by Health and Welfare Canada and communicated directly to departments
(b) Personnel Working with *Pesticides *As defined in the Pesticides Safety Standard, TB STD 3-15.	A. <u>Category II</u> - including blood sample for haemoglobin, white cell count, differential haematocrit and ESR, urinalysis, chest x-ray and a base line cholinesterase determination (red cell and serum).	All personnel prior to assignment to regular work involving organo-phosphorous compounds.

	B. <u>Category II</u> - including a questionnaire directed towards symptomology of poisoning by pesticides, plus periodic cholinesterase determinations while working with toxic organophosphorous pesticides.	All personnel at intervals based upon exposure as determined by Health and Welfare Canada.
	C. <u>Category III</u> - including cholinesterase determination	Immediately if serious exposure to organophosphorous pesticide occurs, and if any symptoms occur which may possibly be attributable to organophosphorous absorption.
14. Lightkeepers (including dependents resident at remote locations).	<u>Category III</u> - including chest x-ray.	Prior to posting and annually.
15. .Underwater Divers .Scuba Divers .Mountain Rescue Workers .Avalanche Forecasters and Observers.	<u>Category III</u> - including pulmonary function test, electrocardiogram, audiogram, urinalysis, chest x-ray, blood sample for Hg. ESR. WBC, and Diff.	Annually
16. Personnel posted to *isolated posts (including dependents) *As defined in the Isolated Posts Regulations or Directives.	<u>Category III</u> - including chest x-ray	Prior to each posting.

17. Personnel serving abroad (including dependents)	A. <u>Category III</u> - including a urinalysis, chest x-ray.	Before each posting.
<u>NOTE:</u> This section is subject to the requirements of the Foreign Service Directives and Regulations.	B. <u>Category III</u> - including a questionnaire designed to screen persons exposed to adverse climatic conditions, or tropical parasitic diseases, etc.	On return from each posting.
18. Air Traffic Control Assistants	A. <u>Category II</u>	Annually
	B. <u>Category III</u>	Every five years.

TABLE II
CATEGORIES OF HEALTH SCREENING

CATEGORY I	- A confidential health questionnaire completed by the employee and screened by a nurse. (Abnormal clinical histories will be brought to the attention of a physician, who will determine whether follow-up action is necessary.)
CATEGORY II	- A confidential health questionnaire administered by a specially trained nurse, who may also perform certain basic investigations, such as blood pressure, visual acuity, audiogram, x-ray, electrocardiogram, blood sample, etc., depending on the type of work and particular hazards involved. (A qualified technician may carry out some of these procedures.)
CATEGORY III	- A confidential health questionnaire, followed by a full clinical history and physical examination performed by a physician, with special investigations as required.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard
 - (1) "integrity" means, in respect of any device or equipment, the ability of that device or equipment to retain all of the qualities essential to its safe, reliable and adequate performance;
 - (2) "personal protective equipment" means any special safety clothing, equipment or device worn or used by a person to protect that person from dangers of employment;
 - (3) "person in charge" means a qualified person appointed to ensure the safe and proper conduct of an operation or of the work of employees;
 - (4) "qualified person" means a person who, because of knowledge, training and experience, is qualified to perform safely and properly a specified job;
 - (5) "safety restraining device" means any safety belt, safety harness, seat, rope, belt, strap or lifeline designed to be used by an employee to protect that employee from the danger of falling, and includes every fitting, fastening or accessory thereto;
 - (6) "safety officer" means a person designated by the Minister of Labour pursuant to Part IV of the Canada Labour Code.

General Responsibility of Departments

3. Where it is not reasonably practicable to eliminate or to control an employment danger within safe limits, and the wearing or use of personal protective equipment by an employee will prevent an injury or significantly lessen the severity of an injury, departments shall ensure that each employee who is exposed to such danger wears or uses that equipment as prescribed by this Standard.
4. The provision of personal protective equipment shall be in accordance with the Policy and Guidelines on the Provision of Clothing to Federal Government Employees.
5. Employees are to be instructed and trained in the proper and safe operation, use and care of all personal protective equipment that they are required by this Standard to wear or use.

6. All personal protective equipment worn or used by employees shall be adequate in all respects to protect the employee from the hazards of employment, be otherwise suitable for use by the employee, and have been so designed that it does not in itself create an employment hazard.
7. All personal protective equipment shall be stored, maintained, inspected and tested by a qualified person for the purpose of ensuring that it is in a safe and fully effective condition at all times.
8. A record of personal protective equipment shall be maintained in accordance with good industrial safety practice, or as recommended by a Labour Canada Regional Director, and shall be readily available for examination. The record should contain the following information:
 - (1) a description of the equipment and date of its purchase or acquisition;
 - (2) the date and result of each inspection and test of the equipment; and
 - (3) the date and nature of any maintenance work performed on the equipment since its purchase or acquisition.

General Responsibility of Employees

9. No employee shall commence a work assignment or enter a work area where any kind of personal protective equipment is required to be worn or used unless the employee
 - (1) is wearing or using that kind of personal protective equipment in the manner prescribed in this Standard;
 - (2) has been instructed and trained in the proper and safe operation and use of that personal protective equipment; and
 - (3) has visually inspected that personal protective equipment to ensure that, as far as reasonably practicable, it will protect him against the hazards of his employment.
10. Every employee shall care for all personal protective equipment that is assigned, in accordance with the instructions and training given as outlined in paragraph 5.
11. Every employee shall immediately report to the person in charge any personal protective equipment that, in the opinion of the employee, no longer adequately provides protection from the hazards of employment.

Head Protection

12. Where, in accordance with paragraph 3, an employee is required to wear a safety hat, the safety hat shall comply with the recommendations of

Canadian Standards Association standard Z94.1-1966 "Industrial Protective Headwear", as amended from time to time, or with a standard recommended by Labour Canada.

13. Where, in accordance with paragraph 3, an employee is required to wear a form of head protection other than a safety hat, such head protection shall comply with good industrial safety practice, or with a standard recommended by Labour Canada.

Eye and Face Protection

14. Where, in accordance with paragraph 3, an employee is required to wear eye or face protection, such eye or face protection shall comply with Canadian Standards Association standard Z94.3-1969 "Eye Protector", as amended from time to time, or with a standard recommended by Labour Canada.

Foot and Leg Protection

15. Where, in accordance with paragraph 3, an employee is required to wear safety shoes or boots, such footwear shall have soles and heels of a material that will minimize slipping under all conditions of their normal use, and in all other respects they shall comply with Canadian Standards Association standard Z195-1970 "Safety Footwear", as amended from time to time, or with a standard recommended by Labour Canada.
16. Where, in accordance with paragraph 3, an employee is required to wear leg protection or foot protection other than safety shoes or boots, such leg protection or foot protection shall comply with the appropriate Canadian Standards Association standard, or with a standard recommended by Labour Canada.
17. No employee shall, in an industrial fabricating, processing, maintenance, repair or storage area or in any work place designated by a department
 - (1) fail to wear footwear; or
 - (2) wear any footwear with open toes, or footwear made of any material or of a construction or design, that in the opinion of a responsible departmental authority or a safety officer, does not adequately protect the employee from the risk of injury associated with employment.

Skin Protection

18. Where, in accordance with paragraph 3, an employee is required to wear personal protective equipment or a barrier cream for skin protection
 - (1) such personal protective equipment or barrier cream shall be adequate to protect the skin of the employee during the entire period during which the skin is exposed to any danger; and

- (2) if such personal protective equipment or barrier cream is not disposable, it shall be maintained in a clean and sanitary condition.

Respiratory Protection

19. Where, in accordance with paragraph 3, an employee is required to wear respiratory equipment, such respiratory equipment shall be of a type approved for its intended use by the United States Bureau of Mines, or by a person or agency recommended by Health and Welfare Canada or Labour Canada.
20. Where air or oxygen is provided in connection with any respiratory equipment referred to in paragraph 19, the air or oxygen shall comply with Canadian Standards Association standard "Purity of Compressed Air for Breathing Purposes", Z.180.1-1973, as amended from time to time, or with a standard recommended by Health and Welfare Canada or Labour Canada.

Safety Restraining Devices

21. Unless an employee is wearing a safety restraining device that complies with this Standard, he shall not be required or permitted to work while standing on or supported by
- (1) any unenclosed or unguarded work structure that is
 - (a) more than eight feet (2.4m) directly above the nearest permanent safe level;
 - (b) above an operating machine that could cause injury to the employee upon contact; or
 - (c) above any open-top tank, pit or vat;
 - (2) any scaffold or other similar temporary work structure that is more than twenty feet (6m) above a permanent safe level and from which the employee may fall if the structure tips or fails;
 - (3) any ladder at a height more than eight feet (2.4m) directly above the nearest permanent safe level if, because of the nature of the work, one hand cannot be used to hold on the ladder; or
 - (4) any other elevated work structure in respect of which a Labour Canada Regional Director recommends that a safety restraining device be used.
22. Notwithstanding paragraph 21, the use of a safety restraining device is not required where

- (1) the use of a safety restraining device is, in the circumstances, unsafe or not reasonably practicable; and
 - (2) other safety measures recommended by a Labour Canada Regional Director are employed.
23. Every ladder from which an employee is working, as described in paragraph 21 (3), shall be secured in such a manner that it cannot be accidentally or inadvertently dislodged from its position.
24. To the extent that it is reasonably practicable, every safety restraining device used by employees is to be of sufficient strength, at all times and under all conditions of its use, to support, without failure or loss of integrity, the maximum load to which it will be subjected and
- (1) a static load of not less than one thousand pounds (450 kg); and
 - (2) a load of not less than four hundred pounds (200 kg) that is applied suddenly at the end of a four foot (1m) vertical drop or such greater distance as the safety restraining device may permit the load to fall.
25. Each type of safety restraining device required by this Standard to be worn or used by employees shall, prior to being worn or used, be tested in the manner and at the times prescribed in this paragraph, for the purpose of determining whether the design and fabrication of that type of safety restraining device satisfies the test requirements of paragraph 27.
26. The test referred to in paragraph 25 shall be conducted by the manufacturer, distributor or seller of the safety restraining device, or by a person or agency recommended by Labour Canada.
27. At least one representative sample of each type of safety restraining device produced by each manufacturer shall, after it is assembled, be subjected for test purposes to
- (1) loads that are one and one-half times the loads prescribed in paragraph 24 (1) and 24 (2); or
 - (2) any other load or test recommended by Labour Canada.
28. If the sample restraining device referred to in paragraph 27 is unable to support without failure of any kind the test load referred to therein, departments shall ensure that none of the restraining devices of which it is representative is used by their employees.
29. The sample restraining device tested pursuant to paragraph 27 shall
- (1) not be placed in service after being subjected to the test loads prescribed by that paragraph;

- (2) be marked or tagged to indicate that it is not to be placed in service;
 - (3) be marked or tagged with the date of the test and the name and position of the person who conducted the test; and
 - (4) be readily available for examination by a safety officer.
30. The test referred to in paragraph 27 shall, with respect to each manufacturer of safety restraining devices, be conducted before distribution. Where there is a change in the design, method of fabrication or the kind of quality of material used in the fabrication of the safety restraining device, the test shall be conducted as soon as is reasonably practicable after the change is made and, in any event, before the safety restraining device incorporating or resulting from that change is distributed.
31. Where a written guarantee or warranty is given by the manufacturer, distributor or seller of a type of safety restraining device, representing that the type of safety restraining device in question has been tested and complies with the requirements of this Standard, that type of safety restraining device may be deemed to have been tested and to comply with the requirements of paragraphs 25 and 27.
32. Any body safety belt is deemed to satisfy the requirements of paragraph 27 if it complies in all respects with the recommendations of
- (1) the Canadian Standards Association standard "Lineman's Fabric Body Belt and Lineman's Fabric Safety Strap", C104.2-1967 as amended from time to time; and
 - (2) the Canadian Standards Association standard "Lineman's Leather Body Belt and Lineman's Leather Safety Strap", C104.1-1967 as amended from time to time.
33. Each fitting, anchor and accessory used in connection with a safety restraining device shall comply with the recommendations contained in the Canadian Standards Association standard "Code of Practice for Window Cleaning", Z91-1959 as amended from time to time, or with a standard recommended by Labour Canada.
34. To the extent that it is reasonably practicable, every safety restraining device shall be worn or used in such a manner that the person wearing or using it cannot fall freely for more than four feet (1m).
35. Paragraph 34 does not apply to a safety restraining device that incorporates a shock absorbing mechanism that limits the effect of the fall to that produced by a free fall of four feet (1m) or less.

36. Not more than one person shall use one lifeline at the same time.
37. All safety restraining devices shall be inspected and serviced by a qualified person at intervals appropriate to their use, and safety restraining devices that are used once a week or more often shall be inspected and serviced by such a person at least once each month.
38. Where a safety officer is of the opinion that an inspection made pursuant to paragraph 37 is not sufficient to determine the strength or integrity of a safety restraining device, or where its strength or integrity is likely to be decreased because of its age or use, he may require that a representative sample of the safety restraining device be subjected to test loads as prescribed by paragraph 24 or such lesser loads as he considers appropriate.
39. Where a safety restraining device fails to meet the requirements of the test referred to in paragraph 38, two additional representative samples of the same type of safety restraining device shall be tested and, if either of such samples fails to meet those requirements, all safety restraining devices of which the samples are representative shall be removed from service.
40. Every safety restraining device that, while being tested has been subjected to a load exceeding its maximum safe working load, shall not be returned to service.
41. For the purpose of paragraph 40, the maximum safe working load is the quotient obtained when the minimum load in pounds (kg) necessary to break the weakest part of the assembled safety restraining device is divided by five.

Drowning Hazards

42. No employee shall work or be permitted to work over water or at any other work location where there is a risk of drowning unless
 - (1) the employee is wearing an approved life jacket or other buoyancy device of a type described in paragraph 43; or
 - (2) the employee is prevented from falling into the water by a safety net or platform or a safety restraining device; and
 - (3) the employee is accompanied by at least one other person.
43. The life jacket or buoyancy device referred to in paragraph 42 (1) shall be a jacket or device capable of supporting a person with his head above water in a face up position, without effort on his part, until he can be rescued.
44. Where circumstances of work over or near water are such that, in the opinion of the person in charge of where recommended by a safety officer, a rescue boat is required, a suitable boat shall be provided and

- (1) where reasonably practicable, be equipped with a suitable motor maintained in operational readiness;
- (2) be operated by a qualified person and fitted with appropriate rescue equipment;
- (3) be held in readiness at a location enabling quick rescue during periods that such rescue services are required.

Loose Clothing

45. Where an employee is wearing loose clothing, long hair, dangling accessories, rings or other jewellery that might become entangled with a machine or any rotating or moving part of that machine, or the metallic part of which might come into contact with energized electrical equipment, the employee shall not enter or be permitted to enter a work area where any such machine or equipment is operating unless the clothing, hair, accessories, rings or other jewellery is so tied, fitted, covered or otherwise secured as to prevent such entanglement or contact.

Traffic Hazards

46. Any employee who is assigned to give traffic signals or direction or who is otherwise exposed to a possible hazard from vehicular traffic during his work, shall
 - (1) wear a high visibility vest or other similar clothing; or
 - (2) be protected by a high visibility barricade.
47. The high visibility vest and barricade referred to in paragraph 46 shall be readily noticeable or distinguishable all of the time, and under all of the conditions that the employee is exposed to vehicular traffic.

Introduction

1. The use of pesticides within the Public Service of Canada requires close control by departments and agencies to ensure that personnel are not exposed to health hazards from these toxic substances. The requirements of this Standard provide only a basic outline of the principal safe practices and procedures which are applicable. Therefore, departments and agencies should, in the development of more detailed local procedures, also utilize other appropriate reference publications pertaining to the safe use of pesticides, including particularly the representative listing in the Table to this Standard.

Application

2. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definition

3. The word "pesticides", as used in this Standard, refers to chemical and biological agents that act as acaricides, chemosterilants, insecticides, fumigants, fungicides, herbicides, rodenticides, nematocides, lampricides, and other toxic substances used for the same general purposes.

Work Procedures

4. Each department or agency which uses, handles or stores pesticides shall ensure that
 - (1) detailed written procedures governing matters concerning the safe handling, use, storage and disposal of such pesticides are developed, prominently displayed in the workplace, and explained to all employees concerned; and
 - (2) such procedures are applied and enforced in respect of all operations, including site preparation and decontamination, pesticide preparation and application, and disposal.

Use, Handling Storage and Disposal

5. The following general requirements shall govern the use, handling, storage and disposal of pesticides:
 - (1) Substitution - Whenever possible, a less toxic pesticide is to be substituted for a toxic one, providing there is no impairment of its intended function.

- (2) Isolation - Personnel are to be isolated as much as possible from exposure to the pesticides being used.
- (3) Protective Equipment and Clothing - Pursuant to the Personal Protective Equipment Safety Standard, TB STD 3-14, approved respiratory protective devices, and personal protective clothing and equipment appropriate to the potential hazard, shall be provided and worn whenever pesticides are handled or used.
- (4) Storage - Pesticides shall be stored in locked cabinets or secure areas, and warning signs shall be prominently displayed to identify such locations.
- (5) Disposal - During disposal procedures, all possible precautions shall be taken to ensure that any person cannot be subsequently contaminated. Waste disposal shall be conducted in accordance with the "Code of Good Practice for Management of Hazardous and Toxic Wastes at Federal Establishments" (refer to Table), or with other codes or requirements authorized by Fisheries and Environment Canada for this purpose.
- (6) Mixing and Dispensing Equipment - Such equipment shall be of a standard acceptable to Health and Welfare Canada or Labour Canada, and be approved for use with the pesticide selected.

Decontamination Procedures

6. The procedures to be used for decontaminating any equipment, container and spill site will vary with the toxic properties of the pesticide, the type of formulation and the quantity. In general, pesticide spills or inadvertent contamination of a site by pesticides should be confined as much as possible by the use of absorbents, such as sawdust or sand. The absorbed pesticide should be put into suitable containers and disposed of in accordance with approved procedures. The site of the spill should, if possible, be cleaned by the use of detergent and water or other suitable and safe solvents, and may also require the addition of caustic compounds in order to accelerate chemical breakdown.
7. Small pesticide containers which are empty should be rendered unusable by crushing and perforation, and disposed of in accordance with approved procedures. Large containers (e.g., drums) should be thoroughly drained, rinsed with a suitable solvent, and the rinsings and containers disposed of in accordance with the appropriate procedures.
8. In most cases, equipment can be decontaminated with detergent and water. The disposal of rinsings must follow approved procedures concerning the disposal of such waste.

Inventories and Labelling

9. An up-to-date inventory of all pesticides in use and in storage shall be maintained. Shelf-life of each container shall be clearly identified, and unused stocks shall be disposed of in an approved manner when the designated shelf-life has expired. All containers shall be properly labelled and identified to permit rapid and accurate identification of their contents. Containers of mixed pesticides, and pesticides in solution, shall be identified as to contents and concentration.

Environmental Monitoring

10. Procedures involving the use of pesticides, either in the laboratory or in general field application, shall be monitored at regular intervals by the responsible authority within the department or agency, to ensure that prescribed safety procedures are being followed. If an independent survey or health investigation is considered advisable at any time, a written request should be submitted to the appropriate Medical Services Regional Office of Health and Welfare Canada in accordance with procedures approved by the Treasury Board for this purpose.

Housekeeping

11. Appropriate good housekeeping shall be followed in all areas where pesticides are mixed, stored or handled. This includes the maintenance of absolute cleanliness of the work place and the use of approved waste disposal facilities and techniques, including adherence to the requirements of the Sanitation Standard, TB STD 3-18.

Education and Training

12. Employees who handle pesticides shall be thoroughly trained in safety techniques respecting potential exposure to highly toxic compounds. This instruction must include the prescribed safe handling procedures, use of protective clothing and equipment, recognition of symptoms of exposure, and provision of first aid in the handling of possible casualties. Information and assistance in this regard shall be obtained from the appropriate Regional Medical Office of Health and Welfare Canada.

First Aid

13. First aid instructions, and emergency procedures to be followed for suspected casualties of pesticide poisoning, shall be displayed prominently in all areas where pesticides are stored, handled or used, and it shall be ensured that employees involved in the use of pesticides are familiar with such instructions and procedures.

Personnel Monitoring

14. All personnel engaged regularly in work involving the handling of pesticides shall be examined at prescribed intervals in accordance with

the provisions of the Periodic Health Evaluations Standard, TB STD 3-13. In this regard, a detailed history of exposure and the nature of exposure should accompany the individual to be examined.

Sources of Information and Assistance

15. Information on registered pesticides may be obtained from the Control Products Section, Plant Products Division, Agriculture Canada, the agency responsible for the regulation of such products.
16. Health and Welfare Canada will provide, on request, information on the effects of pesticide exposure, the treatment of exposed persons and advice concerning appropriate training, including emergency first aid.
17. Labour Canada Occupational Safety and Health Branch will provide, on request, technical and advisory services related to the development of safe operating procedures, and information concerning approved personal protective equipment.
18. The Environmental Protection Service of Fisheries and Environment Canada will provide, on request, advice concerning the disposal of pesticides.

TABLE I
REFERENCE PUBLICATIONS

Pesticides and their Safe Use

The Canadian Agricultural Chemical
Association,
116 Albert Street, Room 710,
Ottawa, Ontario.
K1P 5G3

Poison Control Centres in Canada

Food and Drug Directorate,
Health and Welfare Canada,
Ottawa, Ontario.
K1A 0K9

Pesticide Information and Safety Manual

The University of California,
Agricultural Extension Service,
Berkeley, California, 94720.

The Safe Use of Agricultural and Household Pesticides,
Agricultural Handbook No. 321 - United States Department of Agriculture

Aerial Application of Agricultural Chemicals,
Agricultural Handbook No. 287 - United States Department of Agriculture

Superintendent of Documents,
United States Government Printing Office,
Washington, D.C. 20402.

Canadian Armed Forces Manual on Pest Control - Fourth Edition

National Defence Headquarters,
101 Colonel By Drive,
Ottawa, Ontario.
K1A 0K2
Attention: D.D.D.S. 2-2-2

Recommended Certification for the Qualifications of Pilots and Ground
Personnel for Agricultural and Forestry Aviation - AFA-TN-4

Associate Committee on Agricultural
and Forestry Aviation,
National Research Council of Canada,
Ottawa, Ontario.
K1A 0R6

Handbook for Agricultural Pilots

The International Agricultural
Aviation Centre,
The Hague, Netherlands.

Pest Control Products Act

Compendium of Registered Pesticides in Canada (2 Volumes)

Publishing Center,
Supply and Services Canada,
Ottawa, Ontario.
K1A 0S9

Code of Good Practice for Management of Hazardous and Toxic Wastes at
Federal Establishment (January 1977)

Environmental Protection Service,
Fisheries and Environment Canada,
Ottawa, Ontario.
K1A 0H3

Aerial Application of Pesticides

Environmental Health Directorate,
Health and Welfare Canada,
Ottawa, Ontario.
K1A 0L2

Application

1. The requirements of this Standard apply to and shall be implemented by those Public Service Departments and Agencies as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Scope

2. Notwithstanding the scope of other Federal Government Codes or Standards concerning sanitation, environmental pollution or control, this Standard is primarily concerned with occupational health. It shall have general application in all premises occupied by Public Service Employees, except in the case of buildings not owned by the federal government, where it shall be applied to the maximum extent that is reasonably practicable.

Definitions

3. In this Standard
 - (1) "change room" means a room that is used by employees to change their clothes, and includes a locker room;
 - (2) "lunch room" means a room that is primarily used by employees for the purpose of eating or preparing food;
 - (3) "National Building Code of Canada 1975" means the Code issued by the Associate Committee on the National Building Code, National Research Council of Canada, as amended from time to time;
 - (4) "personal service room" means a change room, toilet room (excluding outdoor toilets), wash room, shower room, lunch room or any combination thereof referred to in this Standard;
 - (5) "potable water" means water of a quality which satisfies the standards of Health and Welfare Canada as set out in the Canadian Drinking Water Standards and Objectives 1968, as amended from time to time;
 - (6) "sanitary facility" means a toilet or personal cleansing facility, and includes a toilet, urinal, wash basin and shower bath.

General Responsibilities

4. Each sanitary facility and personal service room shall be maintained in a sanitary condition at all times.
5. Every person who uses a sanitary facility or personal service room shall use it in such a manner as to ensure that the facility or room remains in a clean and sanitary condition.

Care of Premises

6. It shall be ensured that
 - (1) all janitorial or other maintenance work that may cause dusty or unsanitary conditions is, to the extent that is reasonably practicable, performed after normal working hours;
 - (2) all cleaning, sweeping and other activities are carried out in a manner that will minimize contamination by dust or other injurious substances, and in a manner that will not cause slippery or hazardous conditions;
 - (3) dirt and waste material do not accumulate to such an extent that unsafe or unsanitary conditions will result;
 - (4) each sanitary facility and personal service room is cleaned at least once each 24-hour period following its use by employees.
7. Every garbage-type receptacle that is used for storage of putrescible solid or liquid waste shall be leak proof, equipped with a tightly fitting cover, and so constructed that it can easily be cleaned and maintained in a sanitary condition.
8. Every receptacle referred to in paragraph 7 shall, where necessary, be so designed that internal pressure is relieved by appropriate venting.
9. To the extent that is reasonably practicable, each enclosed part of a work area and each personal service room shall be constructed, equipped and maintained in such a manner as to prevent the entrance and harboring of rodents, insects or vermin.
10. Where rodents, insects or vermin have entered any enclosed part of a work area or a personal service room, immediate action shall be taken for the elimination and control of the rodents, insects or vermin and the restoration of the areas concerned to a sanitary condition.
11. No person shall use a personal service room for the purpose of storing any materials unless a proper closet, fitted with a door, is provided in that room for that purpose.
12. With respect to every personal service room
 - (1) the floors, partitions and walls shall have a durable water-resistant finish and be so constructed that they can be easily washed and maintained in a sanitary condition;
 - (2) the floor, and the lower 6 inches (150 mm) of any walls and partitions that are in contact with the floor, in any room that contains a sanitary facility, shall be watertight and impervious to moisture.

13. Paragraph 12 (2) does not apply to a personal service room that contains a sanitary facility installed prior to the effective date of this Standard if Health and Welfare Canada concurs that the floor can be maintained in a sanitary condition.

Plumbing Systems

14. The plumbing system necessary for the supply of potable water and for the removal of water-borne waste shall comply with the National Building Code, or where appropriate, a provincial or municipal standard not less stringent than the National Building Code.
15. Where a sanitary facility is required on premises that are located within a reasonable distance of a municipal sanitary sewer or water main, or both a sewer and water main, the sanitary facility shall be appropriately connected to the municipal sanitary sewer or water main or to both, as the case may be, in accordance with federal environmental standards or codes governing such installations.
16. Where such a sanitary facility is required and a municipal sewer or water system, or both, are not available, a sewage or water system, or both, as the case may be, shall be installed in accordance with federal environmental standards or codes governing such installations.

Toilet Facilities

17. The number of toilet facilities shall, as a minimum, be in accordance with the provisions of the National Building Code of Canada.
18. To the extent that it is reasonably practicable, a toilet room shall be located not more than 200 feet (60 m), measured horizontally, from, and not more than one storey above or below, every work site.
19. Where toilet facilities are provided for employees of each sex, the maximum number of employees of each sex means the number of each sex usually at the work place on any one shift, but does not include employees who are employed away from the work place for more than 75 per cent of the time.
20. Notwithstanding paragraph 17, where more than one toilet is required for male employees, urinals may be provided in place of not more than one-half the number of toilets required.
21. Where it is not reasonably practicable to install a water closet type toilet connected to a sewage disposal system, a chemical recirculating or combustion toilet or an outdoor "privy" may be installed, provided the facility is constructed and maintained in accordance with the American National Standards Institute standard Z4.3-1970, "Minimum Requirements for Non-Water Carriage Disposal Systems" and amendments thereto, or another standard acceptable to Health and Welfare Canada.

22. There shall be an adequate supply of toilet paper, with a holder, in each toilet compartment. Toilet seats shall be of the parted-front type.
23. An approved covered receptacle for the disposal of sanitary pads shall be provided in all toilet rooms used by female employees.

Wash Rooms and Wash Basins

24. Subject to the provisions of paragraph 28, at least one wash basin with a supply of water shall be provided in every room containing one or two toilets or urinals, and at least one additional wash basin with a supply of water shall be provided for each two additional toilets or urinals.
25. The following minimum requirements shall be adhered to wherever washing facilities are provided:
 - (1) soap or another acceptable cleansing agent shall be provided for each wash basin or shower;
 - (2) single-use paper towels or an approved electric or other drying apparatus shall be provided in each washroom in sufficient quantities to adequately serve the number of employees using the washroom;
 - (3) a non-combustible receptacle shall be provided for the disposal of used towels.
26. Where hot water is provided for washing purposes, it shall be maintained at a temperature of not more than 60°C, and in no case shall it be heated by mixing water directly with steam.
27. Where an outdoor privy or chemical closet is provided, washing facilities shall be located as close to it as reasonably practicable.
28. Notwithstanding the provisions of paragraph 24, where employees are exposed to skin contamination from toxic, infectious, irritating or noxious substances which are a potential safety or health hazard, at least the following number of wash basins provided with both hot and cold water shall be installed:

Number of Employees

1 to 5
6 to 10
11 to 15
16 to 20
More than 20

Number of Wash Basins

1
2
3
4
4, plus 1 for every 15
employees, or portion
thereof, in excess of 20.

29. Industrial wash basins or troughs may be used in place of individual wash basins and their capacity shall be determined by allowing 2 feet (600 mm) of the outside perimeter of the basin or trough for each individual wash basin required by this Standard.
30. A wash basin shall not be installed nearer than 2 feet (600 mm) from any urinal unless it is separated from the urinal by a waterproof partition.

Showers and Shower Rooms

31. A shower room with at least one shower bath for every 10 employees or portion of that number on a work shift shall be provided for those employees who, during the course of their duties, are regularly exposed to body contamination by toxic, infectious, irritating or any other substances hazardous to safety or health.
32. Showers shall be provided with an adjustable supply of hot and cold water which discharges through a single shower head.
33. Soap or other approved cleansing agent and clean towels shall be provided at each shower.

Ventilation of Toilet, Wash and Shower Rooms

34. Each personal service room which was constructed prior to January 1st, 1976, and which contains a sanitary facility, is to be ventilated in such a manner as to provide at least eight changes of air per hour, unless otherwise recommended by Health and Welfare Canada.
35. Unless lesser requirements are approved by Health and Welfare Canada, each personal service room containing a sanitary facility that is constructed, expanded or modified after the publication of this Standard is to be ventilated as follows:
- (1) where the personal service room contains more than one toilet, urinal or shower bath: by mechanical ventilation or by some other means acceptable to Health and Welfare Canada;
 - (2) where the personal service room contains only one toilet, urinal or shower bath: by mechanical or natural ventilation through an adjustable window or similar opening, if
 - (a) the window or similar opening is located on an outside wall of the personal service room, and
 - (b) not less than 2 square feet (0.185 m^2) of unobstructed opening is provided.
36. Where the ventilation of a personal service room is by mechanical means, pursuant to paragraph 35 (1), the rate of change of air shall be not less than 35 cubic feet (1 m^3) of air per minute for each toilet, urinal or

shower bath located in the personal service room, and not less than 10 changes per hour for the room, unless a lesser rate of change is recommended by Health and Welfare Canada.

37. An exhaust system from a personal service room containing a sanitary facility shall not be connected in such a manner that an exchange of air from the personal service room to other rooms can occur.

Potable Water

38. Only potable water shall be used for drinking or washing unless written consent to use raw water for either purpose is obtained from a health authority.
39. Where it is necessary to transport water for drinking or washing, only sanitary portable containers and sanitary methods of handling the water shall be used.
40. Wherever a portable storage container for drinking water is used
 - (1) it shall be securely covered and closed;
 - (2) it shall be used only for the purposes of storing potable water;
 - (3) it shall be disinfected in a manner approved by Health and Welfare Canada at least once each 7 days while in use, and before the container is used following storage;
 - (4) the water shall be drawn from the container in a manner that will preclude contamination of the water.
41. Except where drinking water is provided by a fountain, there shall be provided
 - (1) an adequate supply of single-use drinking cups in a sanitary container located near the water container; and
 - (2) a non-combustible receptacle for the disposal of used drinking cups.
42. The use of a common drinking cup is prohibited.
43. Ice that is added to drinking water or used for the contact refrigeration of foodstuffs shall be made from potable water.
44. Where drinking water is supplied by a fountain, it shall be ensured, where reasonably practicable, that
 - (1) the American National Standards Institute standard A112.11.1-1973 "Drinking Fountains and Self Contained Mechanically Refrigerated Drinking Water Coolers" is complied with; and

- (2) the fountain is not installed in a personal service room containing a toilet.

Clothing Storage

- 45. Change rooms shall be provided where
 - (1) the nature of the work engaged in by an employee makes it necessary for that employee to change from street clothing to work clothing for safety or health reasons; or
 - (2) an employee is normally engaged in work in which his clothing may become contaminated by toxic, infectious, irritating or offensive substances to the extent that it constitutes a health or safety hazard to himself or other persons.
- 46. Where contaminated work clothing referred to in paragraph 45 (2) is changed, it shall be stored, handled or disposed of in such a manner that it does not come in contact with uncontaminated clothing.
- 47. No employee shall wear away from the work place any clothing that has been contaminated.
- 48. When required, facilities shall be provided to wash and dry contaminated clothes before they are worn again.
- 49. Ventilation shall be provided for every change room and the rate of change of air shall be not less than 20 cubic feet (0.6 m³) of air per minute for each of the employees, up to 100 employees, who normally use the change room at one time, unless a lesser rate of change of air is recommended by Health and Welfare Canada.
- 50. Unless otherwise approved by Health and Welfare Canada, each change room that is constructed, expanded or significantly modified after the publication of this Standard shall be ventilated
 - (1) by mechanical means where the change room is used simultaneously by 10 or more employees; and
 - (2) in other cases, by mechanical ventilation or natural ventilation through a window or similar opening, if
 - (a) the window or similar opening is located on an outside wall of the change room, and
 - (b) not less than 1 square foot (0.093 m²) of unobstructed opening is provided for each employee who uses the change room at the same time.

Lunch Room

51. No person shall eat, prepare, or store food
- (1) in a place where toxic, infectious or noxious substances are likely to contaminate food, dishes or utensils;
 - (2) in a personal service room that contains a toilet or shower bath; or
 - (3) in any place which according to Health and Welfare Canada is unsuitable for this purpose.
52. Where a lunch room is provided
- (1) it shall be physically separated, or isolated by special air treatment, from any place where there is a possibility of contamination by toxic, infectious or hazardous substances;
 - (2) it shall not be used for any other purpose that is incompatible with its use as a lunch room;
 - (3) it shall be provided with non-combustible, covered receptacles for the disposal of waste food or other waste material; and
 - (4) dishes or other food utensils shall not be washed in lavatory or sanitary facility wash basins.
53. Unless otherwise recommended by Health and Welfare Canada, each lunch room that was constructed before the publication of this Standard shall be ventilated so as to provide at least 6 changes of air per hour.
54. Unless otherwise recommended by Health and Welfare Canada, each lunch room that is constructed, expanded or significantly modified after the publication of this Standard shall be ventilated
- (1) by mechanical means, where the lunch room is used simultaneously by 10 or more employees; and
 - (2) by mechanical or natural ventilation through an adjustable window or similar opening where the lunch room is used by fewer than 10 employees, if
 - (a) the window or similar opening is located on an outside wall of the lunch room; and
 - (b) not less than one square foot (0.093 m^2) of unobstructed opening is provided for each employee who uses that lunch room.
55. Where mechanical ventilation is provided for a lunch room, the rate of change of air shall be not less than 20 cubic feet (0.6 m^3) of air per

minute for each of the employees who normally use the lunch room at the same time, and not less than 10 changes of air per hour, unless a lesser rate of change of air is approved by Health and Welfare Canada.

Sanitation or Health Codes and Procedures

56. Notwithstanding any other provision of this Standard, where living, dining, cooking and sleeping facilities are provided for employees engaged in construction, maintenance or similar work, those facilities shall comply with the Sanitary Code issued by Health and Welfare Canada in January, 1966, as amended from time to time.
57. Where, in the opinion of a Public Service Medical Officer of Health and Welfare Canada, a code, procedure, or condition referred to in this Standard, or utilized by a department or agency, does not in certain circumstances provide a sufficient degree of sanitation, or may be otherwise inappropriate, he may make recommendations in writing to the department or agency concerning the specific codes or procedures to be applied. Information or advice concerning applicable codes, procedures, and good industrial sanitation and health practices with respect to a specific situation may be obtained from the appropriate Regional Medical Services Office of Health and Welfare Canada.

Application

1. This Standard applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

2. In this Standard
 - (1) "temporary work structure" means any structure or device that is used as an elevated temporary work base for persons or as an elevated temporary platform for materials, and includes any scaffold, stage or staging, walkway, decking, bridge, boatswain's chair, tower, crawling board, temporary floor, any portable ladder or temporary means of access to or egress from any of the foregoing, and any safety net, landing or other device used in connection with such a structure;
 - (2) "person in charge" means a qualified person appointed to ensure the safe and proper conduct of an operation or the work of employees.

Departmental Responsibilities

3. No department shall provide or permit the use of a temporary work structure where it is reasonably practicable to provide or use a permanent work structure.
4. Departments shall ensure that each temporary work structure used by an employee is safe for use, and used in a safe and proper manner.
5. Employees who are required to use a temporary work structure shall be properly trained and instructed in its safe and proper use.
6. Every defect or condition that adversely affects the structural integrity of a temporary work structure shall be remedied as soon as reasonably practicable after the defect or condition is discovered.
7. An employee shall not be required or permitted to use a temporary work structure that, in the opinion of the person in charge, has a defect or condition that may expose any employee to other than the normal danger involved.

Employee's Responsibilities

8. No employee shall use a temporary work structure unless

- (1) authority has been received from the person in charge to use it;
 - (2) the employee has been trained and instructed in its safe and proper use; and
 - (3) the employee, or the person in charge, visually inspects the structure prior to each work shift, to ensure in so far as possible by such inspection that it is safe to use.
9. Every employee shall report to the person in charge, as soon as practicable, any defect or condition in a temporary work structure that may, in the opinion of that employee, create a hazard.
 10. No employee shall use any temporary work structure that has a defect or condition that, in the opinion of that employee, may expose him or any other employee to other than the normal danger involved, until the structure has been examined by the person in charge and declared to be safe for use.

Design, Construction, Installation, Maintenance and Use

11. The design, construction, installation, maintenance and use of every temporary work structure shall comply as appropriate with
 - (1) the National Building Code of Canada, 1975, and amendments thereto; or
 - (2) the National Safety Council's Accident Prevention Manual, 7th Edition, and amendments thereto; or
 - (3) the applicable American National Standards Institute standard; or
 - (4) any other standard that follows good industrial safety practice.
- Note: Information concerning sources of supply, and advice relating to the above data, should be obtained through the regional offices of Labour Canada.
12. Except in an emergency situation, an employee shall not be required or permitted to work on or use a temporary work structure in rain, snow, hail, or electrical or wind storms of sufficient severity to create an occupational health or safety hazard for the employee.
 13. Any temporary work structure, during its use by employees, is to be kept as free as possible of ice and snow, grease, oil or other slippery material, and of any material or object that may trip an employee.
 14. An employee shall not work or be permitted to work from any one of the three top rungs of a single or extension ladder, or from either of the two top steps of a step ladder.

15. An employee shall not use or be permitted to use
 - (1) a ladder that provides access from one level to another level, unless it extends at least three rungs above the higher level; or
 - (2) a metal or wire-bound ladder where the employee or the ladder may come in contact with live electrical circuits or equipment.
16. All portable ladders provided for the use of employees shall be designed, constructed, inspected, tested, used and maintained in accordance with the requirements of the Canadian Standards Association standard Z-11-1969, Portable Ladders, and all amendments thereto, or any other standard that follows good industrial safety practice and is recommended by a Regional Director of Labour Canada.
17. Where there is danger of materials falling from overhead, a structure shall be provided to protect any employee on the temporary work structure.
18. The open sides of any temporary work structure platform shall be equipped with a toeboard of not less than five inches (125 mm) in height, and the lower edge of such toeboard is to be flush with the floor at the outer edge of the platform.
19. Notwithstanding paragraph 18, where a toeboard would create a hazard or interfere with the proper conduct of the work, and a safe alternative means of preventing tools, materials and similar objects from falling off the platform is provided, the height of the toeboard may be reduced to not less than one inch (25 mm).
20. Tools, equipment or materials used on a temporary work structure shall be arranged or secured in such a manner that they cannot be accidentally knocked off the structure.
21. Where vehicular or pedestrian traffic creates a hazard to an employee on a temporary work structure, the person in charge shall ensure that
 - (1) a guard is posted at the base of the temporary work structure to warn vehicle operators and pedestrians; or
 - (2) there are barricades sufficient to prevent such vehicle or pedestrian traffic from coming into contact with the temporary structure.
22. Where safety nets are required to ensure the safety of employees working on or about temporary work structures, such safety nets shall comply with National Safety Council Data Sheet No. 608, and amendments thereto, or with some other standard that follows good industrial safety practice and is recommended by a Regional Director of Labour Canada.

Application

1. This Standard applies to all Public Service Departments and Agencies as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Scope

2. This Standard outlines certain safety requirements concerning the design, construction, use and occupancy of Government-owned buildings. With respect to leased buildings occupied by Public Service employees, the requirements of this Standard shall be applied where reasonably practicable.

Definition

3. In this Standard, a "building" means any structure or enclosure and its immediate premises which is occupied, or is to be occupied, by employees.

General Responsibility

4. No employee shall use, or be required or permitted to use, any building in a manner likely to endanger the safety or health of that employee or of any other person.

Design, Construction and Alteration

5. After the effective date of this Standard, any design, construction or alteration initiated with respect to a Government-owned building or part thereof shall conform, as a minimum, with the requirements of
 - (1) the National Building Code of Canada 1975, as amended from time to time;
 - (2) the Canadian Construction Safety Code 1975, issued by the Associate Committee on the National Building Code, as amended from time to time; and
 - (3) standards issued by the Dominion Fire Commissioner.
6. Plans and specifications regarding the structural safety of a new building or major alteration should, wherever practicable, be submitted to the appropriate provincial and/or municipal authority for review and comment prior to the commencement of work.

Hot Surfaces

7. Steam and hot water pipes, heaters and any other hot surfaces having surface temperatures which could injure any person through bodily contact, shall be guarded or covered in such a manner as to prevent such direct contact.

Doors and Windows

8. Each glass door, and every other transparent part of a building that could be mistaken for a passageway, shall be appropriately marked with conspicuous warning signs or symbols indicating the presence of the glass or transparent material.
9. Each double action swinging door used for two-way pedestrian traffic shall be designed and installed in a manner that will permit persons on either side to be seen by persons on the other side of the door.
10. Where a door or gate extending into a pedestrian or vehicle passageway may endanger the safety of persons or equipment using that passageway, appropriate warning, guarding or other measures shall be provided to facilitate the safe passage of such persons or equipment. Such measures should include the provision of a window in a door, where appropriate.
11. Where an open door, gate or other obstruction temporarily reduces the effective width of a pedestrian or vehicle passageway to less than that required for safe passage, action shall be taken by the person in charge to ensure that, while its effective width is so reduced
 - (1) a person is posted near the door or gate to warn employees of the danger; or
 - (2) barriers are placed across the passageway to prevent persons from passing while the door or gate is open.
12. With respect to exterior pedestrian and vehicle passageways, the lowest projection of any window awning, canopy or other part of a building that projects over such passageway shall be so installed as to provide adequate and safe overhead clearance for every pedestrian and vehicle using the passageway.
13. With respect to the cleaning of windows above the ground level, the American National Standards Institute standard A39.1-1969 "Safety Requirements for Window Cleaning", as amended from time to time, shall be applied.

Floor and Wall Openings

14. All floor and wall openings shall be guarded in accordance with the American National Standards Institute standard A12.1-1967 "Safety Requirements for Floor and Wall Openings, Railings and Toe-Boards", as amended from time to time.

15. Where an employee must attend an open-top bin, hopper, vat, pit or other enclosure from a point directly above that enclosure, the person in charge shall ensure that the enclosure is
 - (1) completely covered with a grating, screen or other cover that will prevent the employee from falling into the enclosure; or
 - (2) provided with a walkway across the top.
16. Any grating, screen, covering or walkway referred to in paragraph 15 shall be designed, constructed and maintained to support a load not less than the maximum load to which it will be subjected at any time, or a live load of 125 pounds per square foot (6 kg/m^2), whichever is greater.
17. Every walkway referred to in paragraph 15 (2) shall be at least 20 inches (500 mm) wide, and shall be fitted with standard railings and toe-boards in accordance with the American National Standards Institute standard A12.1-1967 "Safety Requirements for Floor and Wall Openings, Railings and Toe-Boards", as amended from time to time.
18. Wherever reasonably practicable, the inside wall of all open-top bins, hoppers, vats, pits or other enclosures that are attended from above, and that are not completely covered as prescribed in paragraph 15 (1), shall be fitted with a rope ladder (which is to be secured at the top and is to extend to the bottom of the bin, hopper, vat, pit or enclosure) of sufficient strength to support a static load of at least 1000 pounds (450 kg); or a permanent ladder shall be installed.
19. Every open-top bin, hopper, vat, pit or other enclosure, the walls of which extend less than 3 feet 6 inches (1.1 m) above any adjacent floor or platform used by an employee, shall be
 - (1) covered as required by paragraph 15 (1) and clearly identified as a tripping hazard; or
 - (2) enclosed by a suitable fence or guardrail that extends at least 3 feet 6 inches (1.1 m) above any such floor or platform; or
 - (3) otherwise guarded, protected or controlled in such a manner that persons are prevented from falling into any such open-top bin, hopper, vat, pit or other enclosure.
20. Where, due to the removal of any cover, an opening is created into which persons may fall, barriers shall be securely placed around such openings to protect and warn persons of the hazard.

Ladders, Stairways and Ramps

21. Where any employee is required to move from one level to another level that is 18 inches (450 mm) or more higher or lower, a fixed ladder, stairway or ramp shall be provided between those levels.

22. All fixed stairways shall comply with the American National Standards Institute standard A64.1-1968 "Requirements for Fixed Industrial Stairs", as amended from time to time.
23. Every ramp, walkway, platform or safety landing shall be fitted with railings and guards as recommended in the American National Standards Institutes standard A12.1-1967 "Safety Requirements for Floor and Wall Openings, Railings, and Toe-Boards", as amended from time to time.
24. All fixed ladders shall comply with the American National Standards Institute standard A14.3-1956 "Safety Code for Fixed Ladders", as amended from time to time.
25. Where the end of a stairway is so close to a vehicular traffic route, or to a machine or other hazard, as to endanger the safety of any person using that stairway, action shall be taken
 - (1) where possible, to erect a suitable barrier that will protect employees using the stairway from the hazard; and
 - (2) to post a warning sign near the end of the stairway nearest the hazard.
26. Any fixed ladder that is more than 20 feet (6 m) long shall be fitted with a safety cage for that portion of its length that is more than 7 feet (2 m) above the base of the ladder. The safety cage shall be designed and constructed so as to prevent an employee from falling backwards or sideways off the ladder.
27. Any fixed ladder that is more than 30 feet (9 m) long shall also have, at intervals of 20 feet (6 m), a safety landing or platform that measures at least 2 feet by 2 feet (600 mm by 600 mm).
28. Paragraphs 26 and 27 do not apply to a fixed ladder that is equipped with a serviceable safety climbing device as described by the National Safety Council on Data Sheet No. 606, dated 1968, as amended from time to time.
29. Ladders installed for purposes of emergency evacuation shall be constructed and installed in accordance with the requirements of the Dominion Fire Commissioner.
30. Every ramp shall have the minimum slope that is reasonable for the purpose for which it is used. In no case shall the slope exceed the limit that is recommended by the manufacturer of the equipment that is, or will be, used on the ramp, or that will be safe under the most unfavourable condition of its use, whichever is the lesser.

Housekeeping and Maintenance

31. Nothing shall be left or stored in any passageway or travelled area in a manner that may endanger the safety of persons or the safe operation of vehicles moving through that passageway or area.

32. Every exterior stairway, walkway, ramp, passageway, roof and canopy shall be kept free of accumulations of ice and snow which may endanger the structure or persons. Where necessary, protection shall be provided from dangerous accumulations of ice which may fall from overhead structures.
33. All dust, dirt, waste and scrap material shall be removed from every building as often as necessary, and disposed of in such a manner that the safety and health of employees is not endangered.
34. Every travelled surface shall be maintained in such a condition that the surface is free from splinters, holes, loose floor boards or floor coverings or similar defects, and will resist slipping.
35. Electrical power vaults, switch and generator rooms or enclosures, and other similarly dangerous areas shall be kept locked or otherwise made inaccessible except to authorized persons who are qualified to safely enter or perform work in such areas.
36. Every building shall be kept in such a state of repair and maintenance so as not to endanger the health or safety of any employee.

Illumination

37. The levels and quality of illumination in each building shall comply with the standards or requirements approved and prescribed by the Department of Public Works, or by the department or agency directly responsible for the design, construction, and maintenance of the illumination facilities.
38. Notwithstanding the requirements of the standards referred to in paragraph 37, the levels and quality of illumination shall not be less than that which, in the opinion of a Safety Officer of Labour Canada, is required for the maintenance of safe working and seeing conditions.

Emergency Lighting Systems

39. Emergency lighting systems shall be provided in every location where failure of the regular lighting system would create a condition dangerous to the safety of employees. Such lighting systems shall
 - (1) incorporate a power supply independent of that for the normal lighting system, and operate automatically in the event of an interruption of the normal lighting power supply; and
 - (2) conform to the requirements and specifications concerning Emergency Lighting Systems, issued by the Dominion Fire Commissioner.

Safety Codes, Practices and Procedures

40. Where, in the opinion of a Regional Director of Labour Canada, a code, procedure, practice or condition referred to in this Standard, or utilized by a department or agency, does not in certain circumstances provide a sufficient degree of safety, or may be otherwise inappropriate, he shall, in accordance with the procedures outlined in the Occupational Safety Policy for the Public Service, make recommendations to the department or agency concerning the specific safety codes or procedures to be applied. Information and advice concerning applicable safety codes or procedures, or concerning good industrial safety practices with respect to a specific situation, may be obtained from the Regional Offices of Labour Canada.

III

P R O C E D U R E S

III PROCEDURES

Introduction

This section contains a number of procedural directives relative to the administration of health and safety programs in the Public Service of Canada. Apart from providing special criteria for certain activity areas, they prescribe common courses of administrative action which have been adopted for these programs.

Departments and Agencies are required to ensure that these procedures are incorporated and applied, as appropriate, in their employee health and safety programs.

Application

1. These Procedures apply to Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act. Departments may also be required to comply with other applicable procedures or requirements such as those specified by the Dominion Fire Commissioner, the Atomic Energy Control Board, the Government Employees Compensation Act, or as prescribed in Public Service Occupational Health and Safety Standards.

Definitions

2. In these Procedures
 - (1) "accident" means an event which results in an occupational injury, property damage or material loss (material loss in this case does not include loss resulting from fire, or non-accidental causes such as theft);
 - (2) "disabling injury" means an occupational injury or an occupational illness which requires professional medical attention and which, according to medical authorization, prevents the employee from returning to work for the next regular shift or subsequent workday;
 - (3) "first aid" means treatment or care of occupational injuries and illnesses provided pursuant to the First Aid Standard, TB STD 3-5;
 - (4) "non-disabling injury" means an occupational injury or occupational illness which requires professional medical treatment, but does not require the employee to be absent from work beyond the day or shift on which such injury or illness occurred;
 - (5) "occupational illness" means any disease, abnormal health condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors or substances associated with the work, and which includes acute and chronic illnesses or diseases which may result from inhalation, absorption, ingestion or direct contact with a substance;
 - (6) "occupational injury" means any bodily injury (such as a cut, fracture, sprain, amputation, etc.,) which results from a work accident or from an exposure involving a single incident in the work environment.

Departmental Responsibilities

3. Each department and agency is responsible for ensuring that work accidents occurring within its jurisdiction are, in accordance with these Procedures, investigated, recorded and reported, the causes determined, and appropriate measures taken to prevent similar occurrences. Accordingly, departmental directives and procedures shall be established and maintained to ensure that
 - (1) an effective investigation of each work accident is, in accordance with paragraphs 9 and 10, conducted and completed within seven working days of the occurrence, and the cause or causes determined;
 - (2) prompt action is taken to effect, to the extent that is reasonably practicable, recommended changes in physical conditions or work procedures arising from such investigations; and
 - (3) the required recording and reporting procedures are followed.

Employee Responsibilities

4. Employees shall be appropriately advised that each work accident or occupational illness must be reported to the person in charge as soon as possible after the occurrence, and the employee shall be required to co-operate fully in any related investigation.

Accident Investigation

5. The responsibility for ensuring the effective conduct of accident investigations, including the determination of the cause and the execution of the approved corrective measures, rests with the supervisor in charge of the work being performed at the time of the accident.
6. The assistance of technical specialists should be utilized where required in the conduct of an investigation.
7. Safety representatives located in the Regional Offices of Labour Canada are available to provide technical advice or assistance in such investigations, and may, in accordance with the Occupational Safety Policy for the Public Service, carry out an investigation of any accident.
8. All fatal injuries, other than those attributable to vehicle or aircraft operations, shall, insofar as is practicable, be investigated by regional representatives of Labour Canada.
9. A formal investigation shall be carried out and a Supervisor's Accident Investigation Report completed in the case of every work accident (as defined in these Procedures) which results in

- (1) a fatal injury;
 - (2) a disabling injury;
 - (3) any occurrence which requires rescue, revival or other emergency measures, or to occurrences which cause an employee to lose consciousness, such as exposure to an oxygen-deficient or toxic atmosphere, or electrical shock;
 - (4) property damage and/or material loss (including damage to mobile equipment), the repair or replacement of which is estimated to cost \$500.00 or more.
10. In the case of the following categories of work accidents or injuries, detailed procedures respecting the method and extent of investigation shall be determined according to the requirements of each department:
- (1) non-disabling injuries;
 - (2) accidents causing property damage or material loss, the cost of which is estimated to be less than \$500.00;
 - (3) any other incident or occurrence, the circumstances of which could have resulted in a disabling injury or property damage/material loss of \$500.00 or more.

Distribution of Supervisor's Accident Investigation Reports

11. Copies of the Supervisor's Accident Investigation Report shall be distributed to appropriate levels of management, safety and health committees, safety officers, and elsewhere according to the safety program requirements of the department.
12. One copy of each Report of the accidents specified in paragraph 9 (1), (2) and (3) shall be forwarded to the appropriate District or Regional Office of Labour Canada as soon as possible following completion of the accident investigation.
13. Departments shall inform the appropriate District or Regional Office of Labour Canada of any fatal accident within 24 hours of its occurrence.

Records

14. Departments shall develop and implement procedures and systems for the provision of data concerning employee injury/accident experience, as follows:

(1) Record of First Aid Treatment

A record of all occupational injuries and illnesses that require first aid treatment shall be maintained for at least one year

following the first aid. (Copies of a "First Aid Attendant's Treatment Record Book" are available for this purpose through reference to Supply and Services Catalogue No. 7530-21-852-9254.)

(2) Individual Accident/Injury Record

A concise record of the essential details of each occupational injury or illness (excluding first aid) may be maintained at appropriate responsibility centres, as determined by departments, to provide a convenient monitoring reference. ("Individual Accident/Injury Record" forms suitable for use are available through reference to Supply and Services Catalogue No. 7540-21-029-0179.)

(3) Supervisor's Accident Investigation Report

A Supervisor's Accident Investigation Report shall be completed in accordance with paragraph 9 and copies distributed as outlined in paragraphs 11 and 12. ("Supervisor's Accident Investigation Report" forms, TB 330-10, suitable for this purpose are available through reference to Supply and Services Catalogue No. 7540-21-029-0158.)

- (4) Departments may specify use of a different Supervisor's Accident Investigation Report form designed for individual departmental use, if it provides, as a minimum, the information required on form TB 330-10.

Statistics

15. Appropriate data respecting work accidents and injuries shall be maintained by each department to provide details respecting accident trends, locations and causes and to serve as a basis for monitoring accident experience. Statistical summaries are to be compiled at least semi-annually and departments shall specify the detailed format, scope and distribution of such statistics and summaries in order to reflect internal needs. These records shall, however, include, as a minimum, the following data:

- (1) the number of disabling injuries and non-disabling injuries;
- (2) the number of injuries (disabling and non-disabling) per 100 employee-years (1 employee-year = 2,000 hours);
- (3) the total number of working day lost;
- (4) the number of working days lost per 100 employee-years;
- (5) the number of individual accidents involving property damage or material loss of \$500.00 or more, and the total cost of all such accidents.

Posters Outlining Procedures in Case of Work Injury

16. An outline of the basic procedures which shall be followed in case of work injury has been consolidated in the form of a poster for use on bulletin boards, as described in Table 1. Departments shall reproduce the wording of this poster in any format required, and arrange to have it posted conspicuously at all work places.

TABLE 1
PUBLIC SERVICE OF CANADA
IN CASE OF WORK INJURY

MANAGERS are required to ensure that

- . first aid treatment is available to employees in accordance with Public Service Standards, and that details of each treatment are recorded.
- . each work injury that requires professional medical attention is recorded, and reported within 72 hours of its occurrence in accordance with procedures specified in the Employers' Guide to Procedures under the Federal Government Employees Compensation Act.
- . each Workmen's Compensation Injury Report Form is completed in detail and signed by the foreman, supervisor or other responsible person in charge.
- . in addition to reporting for compensation purposes, accidents are investigated and reported in accordance with Public Service requirements and procedures.

EMPLOYEES are required to

- . obtain first aid treatment promptly.
- . report each work injury to the person in charge as soon as possible after its occurrence.
- . notify the person in charge when it is necessary to leave the work-place to obtain routine medical treatment.
- . notify the person in charge as soon as possible after initial medical treatment has been obtained outside of normal working hours.

This form should be posted in a conspicuous place accessible to all employees.

Introduction

1. Inhalation of asbestos fibres can result in adverse health effects to those exposed. These Procedures, which are issued pursuant to the Dangerous Substances Safety Standard, TB STD 3-2, are intended, therefore, to provide an outline of basic health and safety measures for the protection of employees exposed to an asbestos process.

Application

2. These Procedures apply to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

3. In these Procedures
 - (1) "asbestos" includes any of the minerals crocidolite, amosite, chrysotile, anthophyllite, tremolite or actinolite;
 - (2) "asbestos process" refers to any handling of materials containing asbestos, including
 - (a) the sawing, cutting, drilling or abrasion of asbestos materials;
 - (b) the packing or unpacking of asbestos;
 - (c) the installation or removal of asbestos insulation or coverings;
 - (d) the mixing or application of asbestos cements, plasters, putties or similar compounds;
 - (e) the cleaning of asbestos-contaminated clothing;
 - (f) the storage, conveyance or disposal of materials containing asbestos; or
 - (g) any surface maintenance of asbestos materials that causes the release of asbestos fibres.

Departmental Responsibilities

4. Departments and agencies shall
 - (1) avoid the use or processing of asbestos if it is reasonably practicable to substitute a less hazardous substance;
 - (2) ensure that every asbestos process under their jurisdiction is identified, and that each such process is carried out and controlled in compliance with the requirements of these Procedures;
 - (3) notify the appropriate Regional or Zone Director of the Medical Services Branch, Health and Welfare Canada, concerning the details of every existing and new asbestos process under their jurisdiction;
 - (4) ensure that every employee involved in an asbestos process is familiar, and complies in an appropriate manner, with the requirements of these Procedures.

Control of Airborne Asbestos Dust

5. No asbestos process shall proceed without appropriate control measures such as ventilation, separate enclosure or isolation of the process from workers, to minimize the hazardous dispersal of asbestos dust into the work environment. Advice concerning specific control measures may be obtained by contacting the Regional Office of Labour Canada or the appropriate Regional Medical Services Office of Health and Welfare Canada.
6. Wet or damp processing of asbestos should be instituted wherever possible.
7. Ventilation equipment used for controlling and removing asbestos dust shall be maintained, operated and periodically tested by a competent person to ensure that it continues to operate at design performance in order that the asbestos content of the breathing zone will not exceed the threshold limit value.

Personal Protective Equipment

8. Where it is not practicable to control asbestos dust within the required threshold limit value as specified in paragraph 17, or there are doubts concerning the safety of existing dust levels, the use of personal protective equipment and clothing is required. In such instances, the department shall provide and ensure that each exposed person uses a respirator of a type recommended by Health and Welfare Canada that is appropriate for the required degree of respiratory protection, and any special protective work clothing which may be required.
9. Every person who is required to wear personal protective equipment must be fully instructed in the proper use, care and maintenance of that equipment.

10. Special protective work clothing shall be worn only in the work places or operations for which such clothing is designated. A change room that is suitable for changing into and out of protective work clothing and for clean storage of street clothes shall be provided for the use of employees who work with asbestos. Protective clothing that has been exposed to asbestos should not be taken home by the employee.
11. Departments shall arrange for the laundering of such protective clothing, which must be done in a segregated manner. Clothing that is being laundered or sent for laundering must be separated, identified and handled in a manner that does not expose laundry workers to the asbestos hazard.

Cleanliness of the Work Place

12. Accumulations of asbestos waste or dust produced in any place of employment must be removed at least once daily; heavy accumulations of such waste or dust must be removed as frequently as is reasonably practicable during a work shift.
13. All cleaning to remove asbestos waste or dust shall be performed by vacuum or wet cleaning methods to prevent the dispersal of asbestos dust into the environment, and shall be both collected and disposed of in closed containers.

Health Surveillance

14. All employees, regardless of duties or mode of protection, who are regularly exposed to an asbestos process shall be medically examined annually through the facilities of Health and Welfare Canada.
15. Such examinations shall be carried out in accordance with the Periodic Health Evaluations Standard, TB STD 3-13, and shall consist of a Category III level assessment, including a chest X-ray and pulmonary function tests. Health and Welfare Canada shall maintain detailed records of all employees whose health has been adversely affected through exposure to asbestos, and shall advise the employing department and the Treasury Board of such cases.
16. Employees involved in an asbestos process shall be routinely informed by their department of all known asbestos hazards, and of the corresponding need to develop safe and healthful work and personal habits. Advice and information concerning such risk factors may be obtained through Health and Welfare Canada.

Environmental Surveillance

17. The "threshold limit value" is the eight-hour time-weighted average air-borne concentration of asbestos fibres (not exceeding two fibres longer than five micrometers per cubic centimetre of air) to which a person may be exposed.

18. Air samples shall be taken at a frequency to be specified by Health and Welfare Canada. Samples shall be collected from within the breathing zone of the employees, using membrane filters of 0.8 micrometer porosity, mounted in an open-face filter holder. Determinations will be made at a magnification of 400 to 500 using phase contrast illumination.
19. Employees shall not be exposed to ceiling concentrations of more than 10 asbestos fibres (longer than 5 micrometers) per cubic centimeter of air, as determined by a minimum sampling time of 15 minutes.
20. All sampling methods and techniques shall be carried out according to a procedure outlined and approved by Health and Welfare Canada.

Introduction

1. Under the Public Service Occupational Health Policy, an important aspect of the Public Service health program concerns the provision of a program and procedures for the surveillance of work facilities in order to identify and promptly correct hazards which may adversely affect the health of employees. Where a health hazard is suspected or deemed to exist, qualified personnel should be available to determine the type and extent of the hazard if any, and, where necessary, to recommend measures that will eliminate or reduce the hazard.
2. Accordingly, the Treasury Board, pursuant to its authority under Section 7 of the Financial Administration Act, has authorized these Procedures concerning the investigation and surveillance of occupational health hazards in the Public Service.

Application

3. These Procedures apply to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

4. In these Procedures
 - (1) "Director" means the Regional or Zone Director of Medical Services Branch, Health and Welfare Canada, or another official authorized to act on the Director's behalf;
 - (2) "environmental health officer" means an individual so designated by Health and Welfare Canada, and whose responsibilities relative to these Procedures are detailed in Table 1;
 - (3) "investigation" means the detailed examination of a work process, condition or facility, either in response to a specific request or incident, or as part of the overall program, in order to determine the existence, extent and type of a health hazard;
 - (4) "occupational health hazard" means an identifiable hazard to employee health which is capable of causing an occupational illness, and generally falls into one of the following categories:
 - (a) chemical: liquids, gases, dusts, fumes, mists and vapours;
 - (b) physical: ionizing and non-ionizing radiations, noise, vibration, sanitation, ventilation and extremes of temperature and pressure; and

- (c) biological: insects, mites, molds, yeasts, fungi, viruses and bacteria;
- (5) "occupational illness" means any disease, abnormal health condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors or substances associated with the work, and which includes acute and chronic illnesses or diseases which may result from inhalation, absorption, ingestion or direct contact with a substance;
- (6) "occupational injury" means any bodily injury (such as a cut, fracture, sprain, amputation, etc.,) which results from a work accident or from an exposure involving a single incident in the work environment;
- (7) "survey" means the pre-planned and systematic study or review of working conditions and facilities to identify and evaluate potential health hazards.

Responsibilities

- 5. Departments and agencies shall, in accordance with these Procedures, be responsible for
 - (1) initiating protective measures, as required, and maintaining ongoing conditions necessary to protect employees from exposure to health hazards at work;
 - (2) formally requesting Health and Welfare Canada to undertake occupational health investigations whenever health hazards are suspected;
 - (3) affording environmental health officers access to work locations at all reasonable times; and
 - (4) implementing recommendations made as a result of investigations and surveys.
- 6. Health and Welfare Canada is responsible for
 - (1) ensuring, insofar as practicable, the availability of qualified personnel to carry out the program;
 - (2) undertaking, in liaison with the departments concerned, health investigations or surveys and providing necessary direction to departments for the elimination or reduction of health hazards in the workplace;
 - (3) monitoring compliance with recommendations or directions issued;

- (4) maintaining close liaison with Labour Canada in all regions and, where appropriate, utilizing that Department's technical support and expertise, and reacting to referrals concerning health hazards which are received from that Department;
- (5) maintaining ongoing research and the development of occupational health procedures and related exposure limits to dangerous substances or other occupational health hazards.

Criteria

7. The criteria which govern general health conditions, types and levels of exposure, and the exposure thresholds pertaining to dangerous substances, shall be as determined through reference to Public Service Occupational Health and Safety Standards approved and issued by the Treasury Board or, where not so covered, in accordance with standards or criteria recommended by Health and Welfare Canada.

Procedures for Requesting an Investigation

8. The investigation and survey program is intended to augment departmental responsibilities and initiatives for the ongoing detection and elimination of hazardous or unhealthy conditions. Apart from individual responsibilities in this regard, such conditions may also be delineated through the action of joint management-labour safety committees. Where a potential health hazard is suspected, departments should, in the first instance, utilize and consult with local experts and specialists concerning the matter.
Investigations should not be requested frivolously, or carried out in respect of conditions which do not involve occupational health hazards, as defined in these Procedures.
9. In the event that an occupational health hazard is suspected, a written request, authorized and signed by a responsible departmental official, shall be forwarded to the applicable Director. Departmental requests shall include the following information:
 - (1) the location and description of the facility to be investigated;
 - (2) the general nature of the suspected health hazard; and
 - (3) the name, address and telephone number of the departmental official to be contacted.
10. If an employee believes that he or she may be subject to hazardous working conditions that could cause an occupational illness, whether such hazard is considered to be imminent or not, the employee may request that the person in charge arrange for an investigation of the hazard as soon as possible. Following confirmation that a formal investigation within the scope of these Procedures is required, the person in charge shall make the necessary arrangements through the responsible departmental official.

11. Upon receipt of a departmental request, the Director will, in liaison with the department concerned, schedule the investigation and advise the department accordingly.

Distribution of Reports

12. Upon completion of an investigation or survey, a written report shall be prepared by the environmental health officer and forwarded under the authority of the Director to the departmental official concerned. Directions concerning the implementation of recommendations should be specified, as required.
13. One copy of each report shall also be forwarded to the
 - (1) Senior Consultant, Public Service Health, Medical Services Branch, Health and Welfare Canada, Ottawa;
 - (2) Chief, Occupational Health and Safety Group, Personnel Policy Branch, Treasury Board, Ottawa; and
 - (3) appropriate Regional Director of Labour Canada.
14. Departments shall ensure the appropriate internal distribution of investigation and survey reports. Pursuant to paragraph 10, an employee requesting an occupational health investigation shall be afforded the opportunity to review the investigation report.

Implementation Procedures

15. Changes or measures recommended as a result of investigations or surveys shall be implemented by departments as soon as practicable. The appropriate Director shall be advised when compliance has been effected, and also where an appreciable delay is foreseen in the implementation of recommendations.

Procedures in the Case of Imminent and Serious Danger

16. Where, in the opinion of an environmental health officer, a situation poses both an imminent and serious danger to the health of employees, the department shall be directed to take the required immediate action to rectify or remove the imminent and serious danger. If the imminent and serious danger cannot be immediately rectified or satisfactorily reduced, the environmental health officer shall contact the appropriate Director who shall decide whether or not to order suspension of the operations related to the imminent health danger until the condition has been rectified or the degree of danger satisfactorily reduced.
17. Where a suspension order has been issued, it shall be the responsibility of Health and Welfare Canada, Medical Services Branch, to immediately notify the Personnel Policy Branch of the Treasury Board Secretariat and the Deputy Head of the department or agency concerned of the suspension order.

18. If a department or agency considers that a suspension order is not warranted, it shall comply with the order, but may immediately request the Director to review the department's objectives, and, if the matter is not mutually resolved, the department may appeal directly to the Occupational Health and Safety Group of the Personnel Policy Branch of the Treasury Board Secretariat, which will rule on the matter.

Ongoing Surveillance Program

19. In addition to investigations carried out in response to specific departmental requests, Health and Welfare Canada will also undertake, under the authority of these Procedures and the Public Service Occupational Health Policy, an ongoing survey program of occupational health hazards at locations where such health hazards are deemed to exist. Surveys shall be carried out in accordance with priorities and schedules established by the appropriate Director. Such survey activity shall be closely coordinated at the regional level with Public Service safety inspection activities scheduled by Labour Canada.
20. The requirements of these Procedures shall apply to this ongoing surveillance program (as outlined in paragraph 19) in all respects.

TABLE I
ENVIRONMENTAL HEALTH OFFICER - RESPONSIBILITIES

1. The environmental health officer shall, with the assistance of other health specialists, as required
 - (1) conduct, on behalf of the Director, occupational health investigations or surveys to determine
 - (a) the occupational health hazards which may prevail at work locations;
 - (b) the scope and seriousness of these hazards, and their effect in impairing the health and well-being of employees; and
 - (c) the measures required to eliminate or control these hazards, or to reduce their effects to an acceptable level.
 - (2) interpret and analyse the results of health investigations and surveys.
 - (3) recommend control methods and procedures, where necessary, which will be suitable and effective for adequate employee protection.
 - (4) prepare and forward, under the authority of the Director, a detailed report on each investigation or survey which includes:
 - (a) date or period conducted;
 - (b) location and description of facility;
 - (c) name of departmental official contacted;
 - (d) nature of problem;
 - (e) activities carried out;
 - (f) tests conducted;
 - (g) findings;
 - (h) formal recommendations;
 - (i) suggested improvements.
 - (5) bring to the attention of the Regional Director of Labour Canada, or the Regional Fire Commissioner, or other Departments or Agencies with particular jurisdictions in the area of health, those matters which come under the jurisdiction of these departments or agencies.

Application

1. These Procedures are issued pursuant to the Materials Handling Safety Standard TB STD 3-10, and are intended to provide a basic outline of the principle safety factors and requirements respecting tractors and their operation. They are to be applied by Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definition

2. In these Procedures, a "tractor" means a vehicle designed for agricultural or industrial use which is used to pull, carry, propel or drive agricultural implements; and for landscaping, loading, digging, grounds keeping, highway maintenance and construction services. Tractors used in the servicing or towing of aircraft are not included.

General Responsibilities

3. Departments and agencies are, in accordance with the general principles set forth in these Procedures, responsible for
 - (1) developing and enforcing detailed departmental rules and procedures for the safe operation of tractors, including instructions and procedures for the avoidance of roll-over;
 - (2) ensuring that every tractor is maintained in a safe operating condition;
 - (3) ensuring that every tractor operator is trained and qualified in all respects to operate the tractor to which the operator is assigned; and
 - (4) selecting tractors designed to perform safely under the most severe conditions of operation and use that may be encountered.

Design and Construction

4. Insofar as practicable, specifications for tractors should incorporate the following requirements:
 - (1) Operator controls should conform to generally accepted design and safety standards and, when necessary, the function and direction of movement of controls shall be clearly marked.
 - (2) Seats should incorporate a backrest, be adequately sprung or suspended, and adjustable to the operator's height and weight.

- (3) Tractors not provided with a protective cab should be equipped with fenders over the rear wheels which extend beyond the full width of the wheels and otherwise designed to protect the operator.
- (4) The exhaust from the engine should, where practicable, discharge vertically at least 40 inches (1 m) above the driver, or in such other manner or location whereby the driver is not exposed to the exhaust fumes. If the tractor is provided with a cab, the exhaust should discharge above the roof or in such other manner that exhaust gases are not drawn into the cab.
- (5) Batteries, fuel tanks, oil reservoirs and coolant systems shall, insofar as practicable, be constructed, located and maintained so that, in the event of upset, spillage will not come in contact with the operator.
- (6) Lighting shall be provided which is sufficient to ensure safe operation under all conditions.
- (7) Tractors operated on public roads and on thoroughfares used by other vehicles shall be equipped with lighting and other safety equipment required by the laws of the Province or Territory in which the tractor is operated.

Guard Devices

5. All auxiliary equipment, implements and drive mechanisms including, where practicable, drive belts, shall be provided with suitable guarding devices.
6. Power take-off mechanisms shall be shrouded and, when not in use, enclosed by a guard of a strength sufficient to withstand potential load factors.

Roll-over Protection

7. Where a tractor is likely to turn over under any circumstances of its operation, it shall be fitted with a roll-over protective structure (ROPS) that will prevent the operator from being trapped or crushed under the tractor. ROPS should be designed and installed so as to
 - (1) tend to limit turn-over in any direction to 90°;
 - (2) extend sufficiently to the rear to prevent the operator from coming in contact with attachments in case of a rear tip-over;
 - (3) permit optimum visibility;
 - (4) facilitate the operator's escape in the event of a roll-over;
 - (5) permit convenient attachment and removal of the structure for maintenance repairs; and

- (6) meet, as a minimum, the test procedures and performance requirements set out in USA-OSHA Standards Part 1928, Sub-part C, 1928.51, 1928.52 and 1928.53, as amended from time to time.
- 8. Where a ROPS is fitted, a safety seat belt shall be provided and used when the tractor is being operated. Such seat belts shall be anchored in accordance with USA-OSHA Standards, Part 1928, Sub-Part C, 1928.51, and shall meet the requirements of SAE Standard J4C "Motor Vehicle Seat Belt Assemblies".
- 9. Providing a tractor is not used in a manner and under such conditions that it could turn over, such tractor may be operated without a ROPS under the following circumstances
 - (1) inside a building or in other areas such as orchards, etc., where, normally, the vertical clearance is insufficient to allow a ROPS-equipped tractor to operate and where the use of the tractor is essential to the work being performed;
 - (2) with accessory equipment which is incompatible with a ROPS (e.g., pickers, harvesters, etc.);
 - (3) where, in the opinion of a Labour Canada safety officer, it is not technically feasible to install a ROPS.

Protective "Cabs"

- 10. Where a protective "cab" is installed on a tractor, it shall be constructed so as to provide
 - (1) the same degree of protection against roll-over as that prescribed for a ROPS;
 - (2) sufficient overhead protection from falling objects, where such hazard may be encountered;
 - (3) some means of emergency egress apart from the normal means of entry and exit; and
 - (4) noise attenuation to the extent practicable, in order to reduce dependence on personal hearing protection devices.

Noise

- 11. Tractor operators subject to noise in excess of the levels and/or time-weighting outlined in the Noise Control and Hearing Conservation Standard, TB STD 3-12, shall be provided with approved hearing protectors.

Protective Clothing

12. Personal protective equipment appropriate to the various hazards encountered shall be worn. This may include hard hats, eye protection, respirators, hearing protectors, reflector-type vests, etc. In this regard, reference should be made to the Personal Protective Equipment Safety Standard, TB STD 3-14.

IV

G U I D E S

IV GUIDES

Introduction

In addition to the variety of health and safety subjects covered by the preceding Standards and Procedures, there are a number of activity areas within the Public Service of Canada requiring specialized guidelines and information.

The Guides, which are outlined in this Section, have been developed to meet this requirement and are designed to assist Departments and Agencies in the establishment of programs for the prevention of work-related accidents, injuries and illnesses.

A GUIDE TO
ACCIDENT INVESTIGATION

TB GUIDE 5-2

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ACCIDENT INVESTIGATION

Definition

"The determination of the facts of an accident by inquiry, observation, and examination and an analysis of these facts to establish the causes of the accident and the measures that must be adopted to prevent its recurrence."

Introduction

An effective accident-investigation, record-keeping and reporting system is the heart of a safety program. It facilitates the identification of health and safety hazards, enables the design and provision of preventive measures, and helps determine overall safety program priorities. Most importantly, an accident investigation that is properly and efficiently carried out and is followed by prompt remedial action is one of the most effective methods of reducing accidents.

An accident investigation has two purposes: to determine why the accident happened by identifying all work-related facts associated with it and to subsequently modify work conditions and procedures to prevent a similar occurrence. The supervisor responsible for the work must be totally committed to the accident investigation program. These guidelines are based on that premise.

Departmental Responsibility*

Each department and agency is responsible for ensuring that work accidents occurring within its jurisdiction are, in accordance with these Procedures, investigated, recorded and reported, the causes determined and appropriate measures taken to prevent similar occurrences. Accordingly, appropriate departmental directives and procedures shall be established and maintained to ensure that:

- . an effective investigation of each work accident is, in accordance with these Procedures, conducted and completed within seven working days of the occurrence, and the cause or causes determined;
- . prompt action is taken to effect, to the extent that is reasonably practicable, recommended changes in physical conditions or work procedures arising from such investigations; and
- . the required recording and reporting procedures are followed.

* Extract from "Investigation, Recording and Reporting of Work Accidents and Injuries - Procedures (TB PROC 4-1)".

SECTION 1

THE INVESTIGATOR

The Supervisor

The supervisor, by the nature of his or her position and its inherent responsibilities, possesses a detailed knowledge of the work and the conditions under which it is done and is the appropriate person to undertake the accident investigation. Primary responsibility for investigation should, therefore, rest with the supervisor. Acceptance of this responsibility by each supervisor, combined with a personal commitment to the time and effort involved in such investigations, is required if the program is to operate effectively. The supervisor's responsibility extends beyond determining the cause of the accident and includes exercising supervisory responsibilities to ensure that proper remedial action is promptly taken.

Technical Advisers and Specialists

When investigating accidents of a serious nature, or those which involve highly technical processes, it may be appropriate to engage the services of a technical adviser or other specialist with specialized knowledge of an operation or equipment to assist in the investigation. An "outside" specialist may also provide an additional degree of objectivity to the investigation. When such a person is authorized to conduct or assist in an investigation, it should be carried out in collaboration with the responsible supervisor.

Safety Officer

When available, the organization's safety officer can offer guidance in coordinating an accident investigation. The safety officer cannot be expected to provide technical advice on every operation or to take the place of the responsible supervisor concerning the detailed work operation or procedures. The officer can, however, often help to determine the cause of an accident, as a result of general knowledge and experience with similar accidents and their causes.

Team Approach

The investigation should be carried out by the supervisor directly responsible for the work at the time of the accident. Such investigation may be all that is required to establish the causes and to prescribe corrective action. However, in the event of a serious accident, and particularly when the causes are not readily determinable, a team approach may be advisable. The team would include the supervisor in every case, and other qualified personnel such as the safety officer, technical specialists, and depending on local departmental practice, a member of the local safety committee. It is the supervisor's responsibility to assess his or her own ability to investigate an accident and decide on the extent of backup required.

SECTION 2

THE ACCIDENT INVESTIGATION

Purpose of Investigation

The primary purpose of the accident investigation is to establish the causes as quickly as possible through the identification and examination of all information associated with the accident. The ultimate purpose is to make the required changes in the work conditions and procedures that will eliminate or reduce the risk of a similar occurrence.

Definition of Accident

For purposes of this Guide, an accident is defined as an event that results in an occupational injury, property damage, or material loss (material loss in this case does not include loss resulting from fire or non-accidental causes such as theft). Occupational illnesses should be investigated in the same manner and context as an accident, and the date on which the illness was discovered or reported is considered to be the "date of accident".

Fact-Finding Only

The investigation should be undertaken in a constructive spirit. It is not a fault-finding exercise, and irrespective of the causes determined or the involvement of various personnel, the occasion should not be used for apportioning blame. In establishing the existence of human error, such actions should be dealt with objectively.

Consideration of Information

As soon as possible after the accident, all information relating to the accident should be obtained and a conclusion reached concerning the causes. The investigator should, however, be cautious about accepting incomplete conclusions as the basis for establishing the cause. A normal tendency to reinforce pre-conceived thoughts as to the probable cause should also be resisted. When original factual evidence is not available, conclusions should be based only on substantiated facts or on the best possible logical assumptions. Circumstantial evidence should only be considered, with extreme caution, when no other evidence exists.

Planned Approach to Investigations

Each organization should institute a planned approach to accident investigations supported by general internal procedures, as necessary, to guide supervisors. Fundamentally, such a planned approach should incorporate the following sequence of actions:

- prevent the removal of evidence or the change of conditions at the work scene;

- . determine the specified work procedure;
- . verify evidence of the witnesses and, if possible, the injured employee;
- . record results of special tests or re-enactments;
- . review and select relevant findings and establish causes;
- . recommend appropriate changes based on the conclusions; and
- . carry out the changes recommended to prevent a recurrence of the accident.

Action Following Accident

A planned system of approach incorporating these actions will help to ensure that each accident investigation is carried out in an orderly and effective manner. More detailed guidelines respecting each phase of the investigation follow:

- . Depending on the seriousness of the accident, the scene of the accident should be isolated as much as possible. If someone is injured, immediate medical attention should be given. Ensure that the scene of the accident remains undisturbed.
- . In serious accidents, or when the exact physical situation cannot be maintained for the investigation, a sketch should be prepared and, if possible, photographs taken as soon as possible.
- . The names and addresses of all witnesses should be obtained immediately.
- . If there is a possibility that any circumstances surrounding the accident may constitute an imminent danger to anyone, action should be taken (without awaiting the final outcome of the investigation) to remove the apparent hazard or temporarily discontinue the work under investigation.
- . The investigation should proceed as soon as possible after the accident.

Investigation Interviews

Personnel involved in the accident, including witnesses and, if possible, the injured employee, should be interviewed as soon as possible following the accident, while the events are still clear in their minds, and the resulting information and statements should be recorded in writing. In many cases the injured employee will be the principal source of information.

Before interviews take place, however, the investigator should ensure that he or she is thoroughly familiar with the approved procedures governing the work being performed at the time of the accident.

Any person directly involved should be interviewed first, to determine what was being done before the accident; this should be followed by interviews with co-workers involved or associated in the operation, or in the immediate vicinity. In most circumstances, it is advantageous to interview each person separately.

Before interviewing the injured employee, the investigator should obtain assurance that the interview is medically permissible. Basic information relative to the employee, his or her injury, or other circumstances, should be obtained before the interview. (If the employee's answers vary considerably from known information, the person's physical condition may be such that questioning is inappropriate at that time.)

Proper interview techniques are important. Normally, for example, it is well to remind the person being interviewed of the constructive purpose of the investigation. The investigator should do everything reasonable to put the person at ease and should never appear hostile. Ask the person what happened and try not to interrupt. When more information is needed, it is usually better not to pose direct questions but to ask for clarification of key points. Also ask any pertinent questions required to complete the Supervisor's Accident Investigation Report.

Cause Categories

The two principal cause categories are personal actions by the injured or by someone else, and environmental conditions surrounding the work.

In many accidents a combination of the effects of both cause categories may be evident, and a careful appraisal of the sources of such factors should disclose all of the underlying contributory causes.

A considerable number of potential causes of accidents, arising both from unsafe acts and unsafe conditions, have been identified and catalogued. A list of these is provided in Appendix A of this Guide, as an aid to investigators. (Refer also to Section 5 of this Guide "Contributory Causes and Factors", for additional information.)

Determination of Causes

The specific work procedure (whether right or wrong) that was being performed by the employee at the time of the accident should be determined. The employee's actions immediately before the accident should be compared with the approved procedure for that job. One should attempt to establish and record (in written form) whether the employee lacked skill, knowledge, training, or awareness. Did the employee take a shortcut in an attempt to avoid inconvenience or discomfort? Was the job being performed covered by a safety rule or standard and, if so, was there a deviation from the standard?

It should be determined whether the employee's work environment contributed to the accident. Were there any defects or deviation from approved conditions in respect to tools, equipment, vehicles, or the surrounding work area? If a faulty condition is detected, it should be determined whether the condition was caused by normal deterioration, excessive use, abuse, or faulty design.

No Substantiated Causes

Occasionally, investigators may be unable to decide on the cause. For example, key facts or supporting details may be absent in relation to the type of accident and the injury, or to the employee's version of these. In some instances it may be found also that the type, location, or severity of injury cannot be related to the circumstances of the work or to the accident. In such situations the supervisor should extend the investigation to verify that the accident and the injury occurred as described. If such verification cannot be made, the investigation report should indicate this. Supervisors should also bring such cases to the attention of the person or persons responsible for reporting the injury for purposes of Workmen's Compensation (Government Employees Compensation Act), and provide the essential information concerning lack of verification for inclusion in the applicable Workmen's Compensation Accident or Injury Report or other form specified for this purpose.

Caution

Occasionally it may be useful to re-enact certain elements of the operating procedure, or test equipment under similar conditions of use. In such an event, proceedings should be carried out with extreme caution, briefing the participants fully on the relative hazards and on the safe procedures to be followed. It should be verified that in the event of an accidental deviation from the work procedure or the failure of some equipment, there would be no possibility of damage or injury. If there is any doubt about the safety of a re-enactment it should not be carried out.

Final Recommendations

Once the error that may have contributed to the cause of the accident has been identified, it is the responsibility of the supervisor, supported where necessary by the investigation team, to prescribe the action that must be taken, based on the findings of the investigation, to rectify the hazard or reduce the risk of a similar accident (see Section 3, "Corrective Action"). Once action is recommended, it is the responsibility of local management to review and to change the work procedures or equipment appropriately, and to provide for ongoing monitoring and inspection systems to maintain the work in safety.

SECTION 3

CORRECTIVE ACTION

Physical Conditions

If the investigation revealed that the cause of the accident was related to physical or environmental conditions, action should be taken, as appropriate, to:

- . modify or change facilities or personal equipment or other physical elements at the work location to eliminate or minimize the hazards concerned;
- . undertake special technical studies, tests, analyses, or initiate manufacturing or design inquiries.

Personal Action or Inaction

If the accident investigation revealed that someone's action or inaction contributed to the accident, the following steps may be appropriate:

- . revise the job procedure;
- . undertake the safety training or instruction of all employees involved in similar operations;
- . undertake campaigns to ensure employees' compliance with safety procedures or standards;
- . seek professional medical advice when an underlying mental or physical problem of the employee is suspected;
- . publicize facts and causes of the accident among other supervisors and employees who may be subject to similar hazards.

Supervisor's Responsibilities

In addition to the primary responsibility for ensuring that the accident investigation is carried out, the supervisor is responsible for taking whatever immediate corrective action is authorized within the scope of his or her own authority.

Should any changes in procedures or conditions be required that are beyond the supervisor's assigned authority to approve, recommendations concerning them should be made to higher management in accordance with local departmental procedures. The supervisor should clearly state what is being recommended and give reasons in support of the recommendations to prevent recurrence of the accident.

Unit or Division Head's Responsibilities

The term unit head or division head signifies the level of management to which the first-line supervisor generally reports. The unit head should review the corrective action recommended by the supervisor, as recorded on the Supervisor's Accident Investigation Report form and other supporting documents.

It is usually the unit or division head's responsibility to decide what action is to be taken with respect to any changes recommended by the investigating supervisor. If further study is indicated regarding a proposed change, personal responsibility should be assigned to someone for conducting the study, and a completion date should be established.

The unit or division head should indicate approval or concurrence in writing, with the recommendations made and action to be taken. This practice ensures that this level of management is completely familiar with the accident and its details. It also enables the unit or division head to assess the supervisor's acceptance of responsibility and commitment, to concur with the supervisor's findings, and to add any comments.

SECTION 4

THE ACCIDENT INVESTIGATION REPORT

General

The Supervisor's Accident Investigation Report form is the basic vehicle for providing and summarizing all the facts relating to the accident. Its systematic use is essential in giving line supervisors and managers the opportunity to propose corrective action and to formally indicate their commitment to follow up the corrective measures.

The supervisor in charge of the work is responsible for the completion of the accident investigation report, and the data ultimately recorded on the report form are the end result of the completed investigation process. The report should not be regarded as final until the investigation has been completed, the results (including the corrective action to be taken) recorded, and the report signed by the supervisor. (The accident investigation report should not be confused with the accident report form used for reporting an injury for purposes of Workmen's Compensation pursuant to the Government Employees Compensation Act.)

Public Service Mandatory Reporting Requirements

In accordance with the requirements of the procedures for the Investigation, Recording and Reporting of Work Accidents and Injuries (TB PROC 4-1), an investigation is to be carried out and a Supervisor's Accident Investigation Report form completed in the case of every work accident resulting in:

- . a fatal injury;*
- . a disabling injury, i.e., an occupational injury or an occupational illness that requires professional medical attention and that, according to written medical authorization, prevents the employee from returning to work on the next regular shift or subsequent workday;*
- . any occurrence that requires rescue, revival, or other emergency measures, or occurrences that cause an employee to lose consciousness, such as exposure to an oxygen-deficient or toxic atmosphere, or electrical shock;* or
- . property damage or material loss (including damage to mobile equipment), the repair or replacement of which is estimated to cost \$500 or more.

* These categories require that a copy of the report be forwarded to the appropriate District or Regional Office of Labour Canada as soon as possible following completion of the accident investigation.

Departmental Option

In the case of the following types of work accidents and injuries, detailed procedures concerning the supervisor's investigation shall be determined by each department or agency, according to its own operating requirements:

- . non-disabling injuries, i.e., occupational injuries or occupational illnesses that require professional medical treatment but do not cause the employee to be absent from work beyond the day or shift on which such injury or illness occurred;
- . accidents causing property damage or material loss, the cost of which is estimated to be less than \$500; or
- . any other incident or occurrence, the circumstances of which could have resulted in a disabling injury, or property damage or material loss of \$500 or more.

Distribution of Reports

The appropriate distribution of the completed accident report form is the principal method of publicizing and disseminating the accident investigation information to those involved in the operation, coordination, maintenance, or monitoring of the safety program. Distribution should take place as follows:

- . copies of the Supervisor's Accident Investigation Report shall be forwarded to appropriate levels of management, safety and health committees, safety officers, and elsewhere, according to the safety program requirements of the department; and
- . it is also a requirement that the appropriate District or Regional Office of Labour Canada be informed of any fatal accident within 24 hours of its occurrence.

The Public Service Report Form

The standard form recommended for the Public Service is the Supervisor's Accident Investigation Report, form TB 330-10 (see Appendix B), which has been designed and specified for use in support of the accident prevention program and is available through Supply and Services Canada.

Completion of Report Form

It is essential that each section of the report form be fully completed and that details be recorded accurately. If this is not done, the appropriate use of the report may be prejudiced, and the value of the entire investigation negated. The following general guidelines for completing the report form correspond to sections of the standard Public Service form.

SECTION A

General Information

- This section consists of basic employee personal and identifying data, which can usually be obtained from the department's local personnel records.

SECTION B

Investigation of Accident

- In recording the sequence of events leading to an accident, a clear and concise statement should be provided. If extensive additional notes and comments have been made during the investigation, they should be condensed and may be attached to the report.
- In most situations it is helpful to provide a sketch or photograph.
- Comments on any unsafe physical conditions or acts should be included. Subsequent recommendations for change should be based on these facts.

SECTION C

Property Damage

- Describe the type and extent of property damage in as much detail as space will allow.
- Obtain, if possible, the actual costs or an estimate of the cost of repairing the damaged property to its original condition, and indicate this amount on the form.
- If there is no materiel or equipment damage caused in the accident, indicate this.

SECTION D

Sketch of Accident

- Refer to Section B, "Investigation of Accident".

SECTION E

Preventive Action

- When remedial action has been initiated following a brief investigation after the accident, the action taken should be indicated in the space provided.
- When corrective action or preventive measures of a more extensive nature are required, recommendations concerning them should be inscribed in the appropriate space in sufficient detail.

- Where appropriate, immediate or interim action and completion dates should be designated with respect to the implementation of each corrective measure, and this should be followed up.

Management Comment

The responsible senior manager at each work location should review the form, provide comments, and sign it. These comments should state or confirm the action to be undertaken to prevent a similar accident. Where necessary, the manager should assign specific responsibility to the appropriate person to ensure that the required changes will be made, and should follow up such action personally.

Use of Report by Safety Personnel

Departmental safety officers should receive or have access to copies of all Supervisor's Accident Investigation Reports. Such reports provide the safety officer with a good deal of valuable information concerning the general status of the organization's safety program and, more specifically, are useful in the following applications:

- . to provide information concerning the efficacy of the accident investigation program, thereby evaluating safety performance and progress at various locations;
- . to evaluate the types of accidents and their severity, thus providing information to the safety officer for use in his or her management advisory role;
- . to provide a basis for the completion of statistics, identifying accident trends, and denoting possible deficiencies in the safe supervision of the work;
- . to indicate when special safety surveys and inspections may be required, or to identify the requirements for a review of job safety procedures, or to initiate special studies.

SECTION 5

CONTRIBUTORY CAUSES AND FACTORS

As previously referred to in this Guide, it is often determined that accidents are caused by more than one unsafe act or condition, and in combination with a number of underlying, less evident contributory factors. These contributory factors or causes may arise from particular defects in the organization or from personnel actions or both. The following accident description may help to demonstrate this:

"The operator of a circular saw reached over the running saw to pick up a piece of scrap which was lodged near the saw blade. His hand touched the blade, which was not guarded, and his thumb was amputated."

The Unsafe Condition - an unguarded saw.

The Unsafe Act - cleaning or clearing a moving machine.

Possible Contributory Factors

- . Existence and tolerance of an unsafe condition (unguarded saw blade).
- . Failure to establish and enforce safe operating rules (rules should prohibit cleaning a running or moving machine).
- . Disregard of job safety instructions (if an instruction existed stating that the machine must be stopped before cleaning).
- . Lack of knowledge or training (operator unaware of safe practice, i.e. the need to stop machine before cleaning).
- . Lack of routine safety inspection (which would have identified the unsafe condition and action).

It is apparent from this example that the elementary identification of the unsafe condition or act will not suffice for corrective action. The underlying contributory factors or reasons for the unsafe condition and the unsafe act should be established in order to determine and provide the appropriate corrective measures.

In the example outlined above, the recommendations might include the following:

- . that guards be designed and maintained in place on this and other similar equipment;
- . that job safety training be undertaken to stress that moving machinery must be stopped and safely secured before cleaning or other maintenance;

- . that supervisors enforce observance of the above requirement;
- . that appropriate signs or directives be prepared and posted where the employees may be reminded of the safe procedures to be followed; and
- . that routine inspections be arranged to ensure maintenance of required safety conditions and procedures.

An investigation is neither successful nor complete until all the possible causes and contributory factors are considered, and the actual causes identified and acted upon.

APPENDIX A
A LIST OF FACTORS
CONTRIBUTING TO ACCIDENTS

1. UNSAFE CONDITIONS

Inadequate guarding

Guard weak, defective, poorly designed
Inadequately guarded
Improper shoring in mining, construction, excavating

Defective

Tough
Slippery
Sharp-edged
Poorly designed
Low material strength
Poorly constructed
Inferior composition
Decayed, aged, worn, frayed, cracked

Hazardous arrangement or procedure

Unsafely stored or piled tools or material
Congestion of working space
Inadequate aisle space or exits
Unsafe planning or layout of traffic or process operations
Unsafe processes
Overloading
Misaligning
Inadequate drainage

Improper illumination

Insufficient light
Glare
Unsuitable location or arrangement (producing shadow or contrast)
No light

Improper ventilation

Insufficient air changes
Unsuitable capacity, location, or arrangement of system
Impure air source
Abnormal temperature and humidity (confined area)

Unsafe dress or apparel

No goggles or face shields
Goggles or face shields defective, unsafe, or unsuited for work
No gloves or mitts
Gloves or mitts defective, unsafe, or unsuited for work
No apron
Apron defective, unsafe, or unsuited for work
No shoes
Shoes defective, unsafe, or unsuited for work
No respirator
Respirator defective, unsafe, or unsuited for work
High heels
Loose hair
Loose clothing
Inadequately clothed
No leggings
Leggings defective, unsafe, or unsuited for work
Lack of protective headgear or hard hat unsafe or unsuited for work
No welder's helmet or hand shields
Welder's helmet or hand shields defective, unsafe, or unsuited for work
No welder's protective clothing (spats, capes, sleeves, jackets, and other) or protective clothing defective, unsafe, or unsuited for work
No babbiting mask
Babbiting mask defective, unsafe, or unsuited for work
No safety belts
Safety belts defective, unsafe, or unsuited for work

Unguarded

Lack of guard, screen, enclosure, barricade, fence, insulation, railing, rope (as opposed to inadequate guarding)

Unsafe design or construction

Hazard built into new equipment or structures
Faulty architecture, design, or engineering
Faulty assembly, manufacture, or construction (as opposed to defective through wear and tear or abuse)

2. UNSAFE ACTS

Operation without authority, failure to secure or warn

Starting, stopping, using, operating, firing, moving, without authority or without giving proper signal
Failing to lock, block, or secure vehicles, switches, valves, press rams, other tools, materials, and equipment against unexpected motion, flow of electric current, steam

- Failing to shut off equipment not in use
- Releasing or moving leads without giving warning
- Failing to place warning signs, signals, tags
- Failure of crane signalman to give proper signal

Operating or working at unsafe speed

- Running
- Feeding or supplying too rapidly
- Driving too slowly
- Throwing material instead of carrying or passing it
- Jumping from vehicles or platforms
- Walking backwards
- Working too fast or too slowly (endangering self and others)

Making safety devices inoperative

- Removing safety devices
- Blocking, plugging, tying of safety devices
- Replacing safety devices with those of improper capacity (higher amperage electric fuses, low-capacity safety valves)
- Misadjusting safety devices
- Disconnecting safety devices
- Failing to secure safety devices

Using unsafe equipment, using hands instead of equipment, or using equipment unsafely

- Using defective equipment (mushroom head chisels)
- Unsafe use of equipment (e.g. using iron bars for tamping explosives, operating pressure valves at unsafe pressures or volume)
- Gripping objects insecurely or improperly

Unsafe loading, placing, mixing, combining

- Overloading
- Crowding or unsafe piling
- Lifting or carrying too heavy loads
- Arranging or placing objects or material unsafely (parking, placing, stopping, or leaving vehicles, elevators, and conveying apparatus in unsafe position for loading and unloading)
- Injecting, mixing, or combining one substance with another so that explosion, fire, or other hazard is created (injecting cold water into hot boiler, pouring water into acid)
- Introducing objects or materials unsafely (portable electric lights inside boilers or in spaces containing inflammables or explosives; moving equipment in congested workplaces; smoking where explosives or inflammables are kept)
- Placing or leaving on working surfaces (tools, materials, debris, rope, chain, hose, electrical leads)
- Oil, water, grease, paint on working surfaces

Taking unsafe position or posture

Exposure under suspended loads (fixed or moving)
Putting body or parts of body into shaftways or openings; standing too close to openings; walking on girders, beams, or edges of working surfaces when not necessary; not using proper methods of ascending and descending
Entering vessel or enclosure when unsafe because of temperature, gases, electric, or other exposures
Working on high-tension conductors from above instead of below
Lifting with bent back or while in awkward position
Riding in unsafe position (on platforms, tailboards, and running boards of vehicles; tailing on or stealing rides, riding on apparatus designed only for materials)
Exposure on vehicular right of way
Passing on grades and curves, cutting in and out, road hogging
Exposure to falling or sliding objects

Working on moving or dangerous equipment

Getting on and off moving equipment (vehicles, conveyors, elevators)
Cleaning, oiling, adjusting of moving equipment
Calking or packing of equipment under pressure (pressure vessels, valves, joints, pipes, fittings)
Working on electrically charged equipment (motors, generators, lines, or other electrical equipment)
Welding or repairing of equipment containing dangerous chemical substances

Distracting, teasing, abusing, startling (horseplay)

Calling, talking, or making unnecessary noise
Throwing material
Teasing, abusing, startling, horseplay
Practical joking
Quarrelling or fighting

Failure to use safe attire or personal protective devices

Failing to wear goggles, gloves, masks, aprons, shoes, leggings, protective hats
Wearing high heels, loose hair, long sleeves, loose clothing
Failure to report defective safety apparel

3. REASONS FOR SOME UNSAFE ACTS AND CONDITIONS

Possible Personal Defects

Improper attitude
Conflicting motivations
Violent temper
Absentmindedness

Wilful intent to injure
Nervous, excitable
Failure to understand instructions, regulations, and rules
Wilful disregard of instructions, regulations, and rules
Lack of knowledge or skill
Unaware of safe practice
Unpractised or unskilled

Bodily Defects

Defective eyesight
Defective hearing
Muscular weakness
Fatigue
Existing hernia
Crippled
Existing heart disease or other organic weakness
Intoxicated
General physical condition not adapted to job
Bodily defects
Existing injury (cut, laceration, bruise)

Possible Organizational Defects

Lack of safe job procedures
Inadequate training
Failure to establish and enforce safety rules
Inadequate supervisory training
Tolerance of unsafe conditions
Inadequate design or layout (engineering)
Inadequate inspection program
Inadequate preventive maintenance program
Inadequate safety standards for purchasing

PUBLIC SERVICE OF CANADA
FONCTION PUBLIQUE DU CANADA

SUPERVISOR'S ACCIDENT INVESTIGATION REPORT
RAPPORT DU SURVEILLANT: ENQUÊTE SUR UN ACCIDENT

A. GENERAL INFORMATION - RENSEIGNEMENTS GÉNÉRAUX

NAME - NOM MARTIN, Joseph		JOB CLASSIFICATION - CLASSIFICATION Carpenter		FILE - DOSSIER 78-10
DEPT. OR AGENCY - MINISTÈRE OU DÉPARTEMENT Public Works		DIVISION, BRANCH OR UNIT - DIVISION, DIREC- TION, OU SOUS-SECT.		S.I. NO. - N° D'ASSURANCE SOCIALE 429-438-307
LOCATION OF ACCIDENT (CITY, TOWN, AREA) - LIEU D'ACCIDENT (VILLE, VILLAGE, RÉGION) Edmonton - Workshop		LOCATION - ENDROIT Edmonton, Alberta		
DATE REPORTED TO SUPERVISOR - DATE DU RAPPORT AU SURVEILLANT Jan. 31/78		DATE AND TIME - DATE ET HEURE Jan. 31/78 - 0910 a.m.		DATE OF LAY-OFF - DATE DE MISE EN DISPONIBILITÉ Feb. 1/78
PERSON REPORTING ACCIDENT - PERSONNE SIGNALANT L'ACCIDENT J.P. Robert - Workshop Supervisor				
NATURE AND EXTENT OF INJURY - NATURE ET GRAVITÉ DE LA BLESSURE Left thumb amputated at the first joint and left forefinger lacerated.				
NAMES AND LOCATION OF WITNESSES - OÙ SE TROUVAIENT LES TÉMOINS ET LEURS NOMS J. Cartier - Edmonton Workshop.				

B. INVESTIGATION OF ACCIDENT - ENQUÊTE SUR L'ACCIDENT

DESCRIBE SEQUENCE OF EVENTS LEADING TO ACCIDENT (NAME TOOLS, MACHINES, MATERIALS USED, ETC. AND SKETCH ON REVERSE SIDE IF NECESSARY) DÉCRIVEZ LA SÉRIE DES ÉVÈNEMENTS QUI ONT ENTRAÎNÉ L'ACCIDENT (MENTIONNEZ LES OUTILS, MACHINES, MATÉRIAUX UTILISÉS, ETC., LE CAS ÉCHÉANT, FAIRE UN CROQUIS AU VERSO)	
The injured man was working at a circular saw, cutting 2-inch lumber. While he was reaching over the saw to clear a piece of scrap, he contacted the running saw blade with his left thumb and forefinger.	
LENGTH OF TIME EMPLOYEE HAS BEEN DOING THIS TYPE OF WORK DEPUIS QUAND L'EMPLOYÉ FAIT IL CE GENRE DE TRAVAIL? 3 years	WAS THIS PART OF HIS REGULAR DUTIES? - LE TRAVAIL FAISAIT-IL PARTIE DE SES FONCTIONS RÉGULIÈRES? Yes
DESCRIBE ANY UNSAFE MECHANICAL OR PHYSICAL CONDITION INVOLVED IN ACCIDENT. DÉCRIVEZ TOUTES LES CONDITIONS DANGEREUSES MÉCANIQUES OU PHYSIQUES QUI ONT PU CONTRIBUER À L'ACCIDENT. Saw was unguarded and running.	
DESCRIBE ANY UNSAFE ACT INVOLVED IN ACCIDENT DÉCRIVEZ TOUT ACTE DANGEREUX QUI A PU CONTRIBUER À L'ACCIDENT Clearing a moving machine.	

C. PROPERTY DAMAGE - DOMMAGES À LA PROPRIÉTÉ

DESCRIBE DETAILS OF PROPERTY DAMAGE - DÉCRIVEZ EN DÉTAIL LES DOMMAGES CAUSÉS À LA PROPRIÉTÉ Nil.
ESTIMATED COST OF REPAIRS OR REPLACEMENT - COÛT ESTIMATIF DES RÉPARATIONS OU DU REMPLACEMENT N/A

D.

SKETCH OF ACCIDENT - CROQUIS DE L'ACCIDENT (IF REQUIRED - SI NÉCESSAIRE)

N/A

E. PREVENTIVE ACTION - MESURES PRÉVENTIVES

MEASURES TAKEN TO PREVENT SIMILAR ACCIDENTS - MESURES PRISES POUR PRÉVENIR DES ACCIDENTS SEMBLABLES

- a. All working personnel have been reinstructed today in safety procedures involved, which includes shutting off saw before clearing and cleaning.
- b. Supervisors have been informed to ensure that this safety rule is enforced.

RECOMMENDATIONS FOR FURTHER CORRECTIVE ACTION NECESSARY TO PREVENT RECURRENCE - AUTRES MESURES PRÉVENTIVES RECOMMANDÉES

- a. Guards should be installed on all circular saws by February 28, 1978.
- b. Training sessions for new employees and for personnel now on strength should emphasize the required safe working procedures when using these saws.
- c. Review written job work procedures to ensure that all safety measures are incorporated and publicized among the employees.
- d. Conduct survey on machine guards on all moving machinery and equipment in the shop and correct deficiencies. Survey to be completed by February 7, 1978 and deficiencies corrected by February 28, 1978.

DATE: February 5, 1978

J.P. Robert
SIGNATURE OF SUPERVISOR - SIGNATURE DU SURVEILLANT

MANAGEMENT COMMENT - OBSERVATIONS DE LA GESTION

Agree with recommendations above. Arrange for guards on an urgent basis and advise me when the installation is completed. Arrange training sessions as needed and modify training procedures and manual to ensure this item is fully covered.

DATE: February 7, 1978

E.M. Roger
SIGNATURE AND TITLE - SIGNATURE ET TITRE

SAFETY GUIDE FOR
FIELD OPERATIONS

TB GUIDE 5-4

FOREWORD

A wide range of activities, environmental conditions and hazards are common to field operations, requiring special care and attention on the part of those involved directly, and on the part of supervisory staffs responsible for the control of such operations.

This guide has been prepared accordingly, to focus attention on some major areas of concern, and to serve as a basis for the development of more detailed departmental safety rules and procedures. Particular note should be made of action to be taken before personnel are dispatched on any field operation: thorough planning and careful preparation are essential to the continued safety and good health of those involved.

Purpose

1. Field operations, particularly those undertaken in isolated areas, expose personnel to a wide range of unique occupational risks and hazards. The purpose of this Guide, therefore, is to provide an outline of basic occupational health and safety practices and procedures which may be applied and further developed as required by departments.

Application

2. This Guide applies to all Public Service Departments and Agencies, as defined in Part I of Schedule I of the Public Service Staff Relations Act.

Definitions

3. In this Guide
 - (1) "field officer" means a party chief or other officer to whom during field operations, is delegated the responsibility to manage a project, or a part thereof;
 - (2) "field operations" means those operations and activities conducted by individuals or groups of persons away from the department's premises, such as surveys of an engineering and research nature, forest fire fighting, rescue operations or work parties.

General

4. Departments undertaking field operations should, based on the general requirements of this Guide, issue detailed safety directives governing the conduct of field operations, appropriate to the particular risks and hazards which may be foreseen. In this regard, the following general practices are recommended:
 - (1) one member of each field party (normally the field officer in charge) should be appointed as a safety officer;
 - (2) where a safety officer is not the field officer in charge, a clear definition of the safety officer's authority and responsibility should be provided;
 - (3) an appropriate official or authority in the area should be advised of the geographical location of an isolated field operation, its estimated duration, the normal and emergency methods of communication, and the names or the number of personnel in the party. Provincial Forest Services should be advised as a courtesy;
 - (4) all relevant safety and health standards applicable to the Public Service should be reviewed prior to departure (see paragraph 31 for list);

- (5) inexperienced personnel who will be working in isolated areas should be provided, where required, with basic survival training or information.
5. Members of the field party should be briefed by the designated safety officer on the basic safety and health rules to be observed according to the type of field operation and the expected environment, including the following:
- (1) the location of the nearest available emergency medical facility, police station, military or forestry establishment;
 - (2) the procedures to be followed in the event personnel become lost, or in the evacuation of seriously ill or injured personnel;
 - (3) the location and method of operating of any emergency equipment provided or available in the area;
 - (4) the procedure to be followed for carrying out regular field operation reviews for the purpose of identifying and eliminating unsafe and unhealthy conditions and practices; and
 - (5) procedures to be followed in the event of encounters with wildlife, particularly bears.

Equipment

6. Departments should ensure that all field and safety equipment is checked for suitability and serviceability prior to issue, and re-checked by field and/or safety officers on receipt. Personnel should be instructed on the proper use, care and maintenance of field and safety equipment.

Boat and Water Safety

7. Comprehensive safety guidelines, embodied in the Transport Canada publication "Boating Safety Guide" concerning the use of boats, both powered and unpowered, should be followed. The wearing of approved type life jackets should be enforced in accordance with the provisions of the Personal Protective Equipment Safety Standard, TB STD 3-14.

Snowmobiles

8. Safety rules concerning the operation of snowmobiles, such as those outlined in the booklet "Play Safe with Snowmobiles" (available from the Canada Safety Council), should be followed. In addition, snowmobiles should be operated in compliance with local regulations governing their use. Additional safe operating procedures are contained in the Safety Guide for Operations Over Ice, TB GUIDE 5-3.

Motor Vehicles and Trailers

9. Departmental safety rules and procedures concerning the operation and use of government-owned or leased motor vehicles and trailers, encompassing the applicable requirements of the Motor Vehicle Operations Safety Standard, TB STD 3-11, should be developed and enforced.

Diving Operations

10. Personnel performing diving duties should be physically and mentally fit to perform each task, and be in possession of a valid certificate of qualification satisfactory to the department.

Sanitation and Hygiene

11. The field officer in charge should ensure, as far as is practicable, that personnel involved in the preparation and serving of food are free from any communicable disease, and that sanitation and shelter facilities are maintained in a manner that does not constitute a health or ecological hazard.

Vehicle Traffic Hazards

12. All field operation crews exposed to hazards from vehicular traffic should wear a high visibility vest or other similar clothing, and use appropriate warning signs or be protected by a high visibility barricade in accordance with the Personal Protective Equipment Safety Standard, TB STD 3-14.

Tent Heaters, Gasoline Stoves and Lanterns

13. All heaters, gasoline stoves and lanterns should be carefully fuelled and lighted, and care should be taken to keep all open-flame models away from combustible materials. During the use of such equipment in tents, shelters, or any confined enclosure, adequate ventilation should be assured to eliminate the possibility of carbon monoxide poisoning or oxygen deficiency.

Firearms

14. No person should be allowed to handle or use a firearm unless the department is satisfied as to that person's sense of responsibility, competence and demonstrated knowledge of accepted safety practices in the use of firearms.

Use of Explosives

15. Good industrial safety practices and departmental regulations, where applicable, should be followed with respect to the handling, preparation or firing of explosive charges. Information in this regard is available from Labour Canada in Technical Data Sheet "The Safe Use of Explosives in Federal Enterprises". The "Explosives Act of Canada" should also be observed.

Fire Prevention and Fire Fighting

16. Basic fire fighting rules and procedures should be developed and enforced for specific field operations consistent with the general requirements and standards prescribed by the Dominion Fire Commissioner. Provincial forestry requirements should be observed where applicable. Fire fighting should be controlled by experienced crew leaders, and appropriate safety clothing and footwear worn.

Air Transport Operations

17. The safety of personnel travelling by air is a prime consideration when making arrangements for transport by charter aircraft. Departments should conclude contracts only with those air carriers who have demonstrated compliance with Transport Canada standards relating to air carriers. These standards are found in the Air Navigation Orders (ANOs) available from Supply and Services Canada, which contain safety-related regulations; designated safety officers should carefully review the following ANOs, as appropriate, before the operation begins:
 - (1) ANO VII, 3 - Standards and Procedures for Air Carriers Using Small Airplanes in Air Transport Operations.
 - (2) ANO VII, 2 - Standards and Procedures for Air Carriers Using Large Airplanes in Air Transport Operations.
 - (3) ANO VII, 6 - Standards and Procedures for Air Carriers Using Rotocraft in Air Transport Operations.
18. Non-compliance with these safety procedures, or any other unsafe practices or conditions, should be reported to Transport Canada, ASP, Transport Canada Building, Ottawa, K1A 0N8.
19. Emergency Equipment and Exits. A seatbelt is required for every passenger. The seatbelt shall be secured during takeoff and landing and whenever considered necessary by the flight crew. Each passenger seat shall be provided with printed information listing the emergency equipment carried, and the location and operation of emergency exits. The emergency equipment and rations detailed in ANO V, 12, shall be carried on all flights conducted within the "sparsely settled area" which is defined in the Order. There should be a readily-accessible lifejacket or flotation device for each person on board a floatplane, and the location of these made known to the passengers by the pilot or aircrew.
20. Personal Clothing. The probable temperature in the area of the flight should be known, and appropriate footwear (not street oxfords) and clothing worn or carried, including clothing to protect against insects in summer months.

21. Emergency Locator Transmitter (ELT). All aircraft are required to carry a compact radio, which transmits a distinctive signal on the emergency frequency of 121.5 MHz for the detection and location of downed aircraft. It will normally be triggered "on" automatically during a forced landing. If the ELT is not automatically triggered, it can be turned on manually. The battery life of an ELT is at least 100 hours, and signals can be heard up to 100 miles (160 km) away by high-flying aircraft. The ELT provides a homing signal to pinpoint location and greatly reduces time-to-rescue.
22. Information on the location and operation of the ELT is placarded in the cabin, and its location is marked externally on the aircraft. It is usually mounted behind the cabin or to the rear of the aircraft. Before boarding the aircraft the crew should describe the location and operation of the ELT.
23. More information on the ELT and the search and rescue system is in a colour slide/sound presentation available on loan from any Regional Office of Transport Canada.
24. Flightplans. The purpose of the flightplan is to ensure that a record is available if an emergency develops. For every flight, a flightplan form should be filed by the pilot through the company, (or an agent), for transmission to air traffic control. If this is not possible, the pilot is required to notify a responsible person of his proposed flight by means of a flight notification or flight itinerary. This should specify the estimated duration of the flight or series of flights, the estimated time of return, the route or the area boundaries of the flight operation, and the location of any overnight stops.
25. The pilot is responsible for the safe conduct of the flight, and should not be unnecessarily distracted from the task of flying. Passengers should not request changes from the flightplan for personal reasons such as sightseeing, photography, low flying, etc.
26. Weather. It is the pilot's responsibility to determine if weather conditions are suitable for a safe flight, and passengers should not attempt to influence the pilot's decision in this regard. Normally, safe visual flight, i.e. flight with visual reference to the ground, requires a 1000-ft (300m) cloud ceiling and 3 miles (4.8 km) forward visibility. However, minimum requirements permit flight with a 700-ft (210m) cloud ceiling and 1 mile (1.6 km) forward visibility. If weather falls below these limits, visual flight must be discontinued. Visual flight above a cloud layer is not permitted.
27. Cargo. Personal baggage and equipment should be properly secured. When cargo is carried in the cabin with passengers, it should be secured by nets, strapping or other tiedown to prevent shifting in flight. Cargo should not be placed so as to restrict the use of emergency or regular exits. It is the pilot's responsibility not to exceed the aircraft's total "maximum gross weight", and to ensure that the load is distributed

so that the aircraft is within its centre of gravity limits. Passengers carrying their own baggage and equipment should ask the pilot where it is to be placed; the pilot should not be pressed to put on extra items that might overload the aircraft.

28. Propellers and Rotors. Every year rotating propellers and rotors cause fatal and serious injuries because they are difficult to see when in motion. Passengers should not board, leave or work around aircraft when propellers or rotors are in motion. The helicopter is often an exception to this rule, when rotors must be kept in motion at remote landing sites. Passengers should receive a thorough briefing from the pilot or crew member before boarding or leaving a running helicopter. Most accidents occur when persons walk into the tail rotor. The safe procedure is to crouch low and approach or depart the helicopter from the side or the front but never near the tail rotor area. Never walk downslope toward the helicopter and never walk upslope away from the helicopter.
29. A passenger should not normally perform any crew function unless safety is otherwise in jeopardy. In any case, a passenger must receive a thorough briefing, including safety procedures, from the pilot or flight crew member. An inexperienced floatplane passenger attempting to assist the pilot to dock exposes himself to extreme danger from the rotating propeller. Passengers have been struck by propellers while walking forward to the front end of the float to tie the aircraft to a dock or mooring point. After docking, twin-engine floatplanes create a hazard to persons when rotating propellers overhang the dock. Passengers should not disembark from these aircraft until the propellers are stopped.
30. Additional safety information is given in a colour slide/sound presentation entitled "Safety Around Small Aircraft", available from any Regional Office of Labour Canada.

Other References

31. In addition to other applicable safety standards, procedures and guides approved by the Treasury Board for the Public Service, the following specific documents should be reviewed in conjunction with this Guide, and applied as appropriate:
 - (1) First Aid Standard, TB STD 3-5.
 - (2) Hand Tools and Portable Power Tools Safety Standard, TB STD 3-6.
 - (3) Personal Protective Equipment Safety Standard, TB STD 3-14.
 - (4) Motor Vehicle Operations Safety Standard, TB STD 3-11.
 - (5) Periodic Health Evaluations Standard, TB STD 3-13.
 - (6) Safety Guide for Operations Over Ice, TB Guide 5-3.

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CHAPTER I

INTRODUCTION

- 1.1 The operation of laboratories exposes employees to a wide range of occupational risks and hazards. Due to the complex and highly variable nature of these operations, these guidelines provide only a basic outline of the principal safe practices and procedures applicable thereto. All applicable and authorized standards or special instructions should be available for reference by laboratory staff.
- 1.2 Departments and agencies which carry out laboratory work should develop and issue their own detailed safety directives, based on the general requirements of this guide and good industrial safety practices. The directives should indicate, where necessary, when compliance is mandatory for safe operations. Such directives should also include specific references to the use of personal protective equipment in relation to the hazard or exposure encountered.
- 1.3 While all those employed in laboratories have a responsibility to follow safe practices and support the safety program, the principal responsibility and authority for ensuring the safety of laboratory operations rests with the person in charge.
- 1.4 Where chemicals are being used, all materials and procedures should be reviewed regularly for hazards by a professional chemist, biochemist or chemical engineer; changes in materials and procedures should be made to reduce any hazards observed.
- 1.5 Effective communications between all levels of management and between managers and employees is essential for the promotion of safe and healthful working conditions. It is recommended, therefore, that wherever appropriate, safety committees be organized to meet as required to discuss, plan and review the safety of laboratory operations, and where necessary make recommendations to management relative to occupational health and safety.
- 1.6 A program of preventive maintenance of facilities and equipment is also viewed as an important aspect of laboratory safety. In this regard, laboratory personnel should be encouraged to report faulty equipment or procedures and to draw attention to preventive maintenance requirements where applicable.

CHAPTER 2

GENERAL LABORATORY DESIGN CRITERIA

2.1 General

This chapter sets out certain information and suggested criteria for the design of safe laboratory facilities, intended to be of assistance to those responsible for laboratory design. The guidelines outlined in this chapter are not intended to cover all facets of laboratory design.

- 2.1.2 Application - It is recommended that these criteria be considered for application or incorporation, where reasonably practicable, into the design of any new or renovated laboratory facilities.
- 2.1.3 Fire Protection - Fire safety rests within the jurisdiction of the office of the Dominion Fire Commissioner, and is covered by Standards issued by that office; hence design aspects related to fire protection or fire safety are excluded from this section except where reference to fire protection standards is required.
- 2.1.4 Interpretation - Persons requiring assistance or advice concerning the interpretation or application of these criteria on laboratory design, should contact the Design Directorate, Department of Public Works, Ottawa.

2.2 General Considerations for Design

- 2.2.1 The design of laboratories, and their furnishings, should aid the implementation of good safety practice yet remain economical. The key to a successful design is a thorough understanding by all design disciplines of the nature and type of work to be conducted in the proposed laboratory.
- 2.2.2 Benching - Continuous tops are needed in wet laboratory areas to prevent the entry of contaminants and liquids between counter units. In dry laboratory areas, joints are acceptable between benching unit tops but these should be secured and tight. Generally, uninterrupted benching should be provided with a cleansweep for housekeeping and without hazard to glassware caused by service outlets.
- 2.2.3 Service Outlets - Deck-mounted services with outlets installed behind the plane of a raised front are recommended. When services themselves could be hazardous due to heat or pressure (steam, compressed gases) the outlet tips should, if possible, be angled down toward the bench top, and should be equipped with reliable and safe shut-off and operating devices.

Controls for services should be easily reached without the need for the operator to lean forward over benching or to pass his hand among glassware, equipment, etc. to reach the control.

- 2.2.4 Storage - Corrosive chemicals require to be stored on low shelves or cupboards for safety; chemicals of hazardous combination require separate storage. Extremely strong oxidizers (e.g. perchlorates) or potentially unstable compounds require individual and separate storage.
- 2.2.5 Floor Strength - Since occupancy and use can change quite frequently, introducing appreciable change in floor loading requirements, care should be taken to ensure that the building design is adequate with respect to loading, and that the building structure remains safe after other, changed, operations begin. Final drawings should show permissible floor loads, which should be carefully observed.
- 2.2.6 Pressure Vessels - Designs and installations should be in accordance with related standards. All fittings should meet requirements of the inspecting authority.
- 2.2.7 Environmental Standards - Spaces for employee occupancy in laboratories should be maintained at the comfort level as established. Spaces requiring special functional or operational conditions - temperature, humidity, air purity or other - should be served by separate environmental engineering systems.
 - 2.2.7.1 Fume Hoods - Contamination from laboratory work and chemical testing procedures should not be permitted to reach the breathing zones of laboratory personnel. This can be achieved by restricting the contaminant-producing procedures to an enclosure or hood which is exhausted to the outside. A laboratory fume hood is a ventilated enclosed work space consisting of side, back and top enclosure panels, a work surface or deck, a work opening called the face, and an exhaust plenum equipped with horizontal adjustable slots for the regulation of air flow distribution. The work opening may be unrestricted or may be equipped with operable glass doors for observation and shielding purposes. In the design of a fume hood and its exhaust system the following factors should be considered:
 - (a) effective capture velocities to remove contaminants;
 - (b) a balanced air supply;

- (c) even air distribution;
- (d) safe construction materials for hood, ducts and fans;
- (e) hood location - away from corridors or doors;
- (f) fan location - for negative pressure in whole exhaust system;
- (g) face velocity control - adjustable air slots, baffles and by-pass systems;
- (h) exhaust dispersal to atmosphere and/or exhaust air treatment;
- (i) size of hood - as small as possible for maximum safety;
- (j) specific hazards of laboratory operations, such as potentially explosive accumulations from perchloric acid, or spread of infectious aerosols.

2.2.7.2 Fume hoods are required for work that generates dusts, fumes, gases and vapors that must not be released into the laboratory environment. These contaminants may be toxic, corrosive, flammable or unpleasant. Certain highly toxic materials must be worked only in total enclosures, e.g. plutonium and certain carcinogens.

2.2.7.3 Since it is impossible to provide one type of hood for all possible uses it is imperative that laboratory managers and laboratory supervisors ensure that hoods are restricted to the uses for which they have been designed. A general purpose fume hood for use in chemical and associated laboratories must be capable of being used for a broad spectrum of materials, and during its expected working life both the materials used in it and the staff associated with it are likely to change. It is therefore important that any limits imposed on the hood use be clearly posted and maintained.

2.2.7.4 Thermal convection currents within the hood or mechanical agitation and aspirating action by cross currents of air outside the hood can adversely affect safe operation and allow contaminants to enter the working zone. Hoods should therefore be kept free of unnecessary apparatus and be operated with the sash

at the smallest possible opening. When the hood is not in use, the sash should be closed for maximum safety.

2.2.7.5 The required air velocity at the hood face will vary, depending on the chemicals and test materials being used. Normally, to prevent or limit the escape of contaminants or discomforting fumes, an average velocity of from 100 to 150 ft/min (0.5 m/s to 0.76 m/s) will be required. Because air velocities of this nature require extensive air make-up and exhaust systems, the required velocities may in certain instances only be obtainable with the sash in the normal working position, or at a sash opening of not less than 12 inches (0.30 m). Nevertheless, where the work involves chemicals or materials of significant toxicity, the required air velocities should be obtainable with the sash fully open.

2.2.7.6 The degree of hazard present during fume hood operation is influenced by factors such as

- (a) the proximity of breathing zones to the contaminant emission point;
- (b) the frequency and duration of contaminant emission;
- (c) the inherent air current disturbances;
- (d) the direct handling and process manipulations required;
- (e) the operator attendance time;
- (f) the quantity of contaminants released to air; and
- (g) the potential health effects of any airborne contaminants.

Advice on the degree of hazard associated with specific contaminants may be obtained from the various Regional Medical Services Offices of Health and Welfare Canada.

2.2.7.7 Guidelines for air velocity at the hood face are provided in Table I, illustrating the recommended average face velocities for various degrees of hazard. The maximum sash openings at which the face velocities must be obtainable take into account the

safety of persons using the hoods, the conduct of the work, and the problems encountered in providing the required face velocities. When a sash opening of less than full face height is used to establish face velocity, a positive stop should be installed to prevent inadvertent use of the hood with a larger sash opening. The stop may be designed with an override to permit full opening of the sash when required for the insertion and removal of test equipment and materials, maintenance and cleaning of the hood, etc. A permanent and clearly worded decal should be displayed prominently, to define the safe operating parameters.

- 2.2.7.8 Hood Construction - Fume hoods should be constructed of suitable fire and corrosion resistant materials and with glazing components appropriate to the hazard involved.
- 2.2.7.9 Hood Services and Controls - Piped services with outlets inside a fume hood should be remotely controlled from accessible locations outside the hood enclosure. Fittings and installations should meet all applicable codes. Switches, rheostats and other control devices for electrical apparatus to be used within hoods should be located on the outside of the apparatus enclosure. Explosion proof electrical components external on hoods, or in hoods, are required only when the area environment is an explosive hazard.
- 2.2.7.10 Electrical - The hood ventilating fan motor and all wiring and equipment should bear the approval label of, and be installed in accordance with, the Canadian Electrical Code CSA 22.1. Electrical equipment should be of a type suitable to the hazards of the location as defined in the Canadian Electrical Code, Section 18. Grounding strips should be provided across electrical interruptions in metallic ductwork.

TABLE I

GUIDELINES: VELOCITY AT HOOD FACE

<u>Degree of Hazard</u>	<u>Average Velocity At Hood Face</u>	<u>Sash Opening</u>
(a) Low level radioactive tracer materials and chemicals with nominal toxicity hazards	100 fpm (0.5 m/s)	12" (0.30 m)
(b) Moderately hazardous air contaminants with a higher risk of personal exposure	150 fpm (0.76 m/s)	12" (0.30 m)
(c) Perchloric acid hoods	150 fpm (0.76 m/s)	12" (0.30 m)
(d) Highly radioactive materials or hazardous chemicals	150 fpm (0.76 m/s)	Full open

- Notes:
1. Variations in air velocity across the working face should not exceed ± 25 per cent, and periodic tests should be made to ensure that hoods continue to meet the desired specifications.
 2. Glove boxes or total enclosures should be used whenever practicable, when velocities of 150 fpm (0.76 m/s) or above are required.

2.2.7.11 Exhaust Fan - The fan blades should be of a non-corrosive, non-sparking metal. If the fan is belt-driven, the belt should be a conductive type to prevent the accumulation of static electricity. The fan should be located near the fume exhaust duct outlet to eliminate the possibility of fume leakage from a pressurized section of duct. Exhaust ducts should be located with due regard to any air intakes and designed so that exhaust is effectively dispersed.

2.2.7.12 Hoods for use with perchloric acid should be constructed of acid resistant material, be liquid tight, with vertical and separate exhaust ducts, and with spray wash-down of both hood and duct. A roof-mounted venturi fan is recommended.

2.3 Laboratory Design Codes, Standards and References

- 2.3.1 General Requirements - The following should be followed in the design and construction of laboratories:

- National Building Code of Canada;
 - Fire Protection Engineering Standards - and other fire prevention or protection directives issued by the Dominion Fire Commissioner;
 - All applicable codes issued by the Radiation Protection Bureau of Health and Welfare Canada;
 - Care of Experimental Animals - A Guide for Canada, issued by the Canadian Council of Animal Care;
 - Hazardous Substances Code - issued by the National Fire Protection Association, the Chlorine Institute Inc.;
 - All Health and Safety Standards approved by the Treasury Board for application in the Public Service of Canada.
- 2.3.2 Boilers and Pressure Vessels - Boilers and pressure vessels used in connection with building systems should comply in all respects with the standard respecting the safe operation of Boilers and Pressure Vessels, Public Service of Canada.
- 2.3.3 Illumination - To the extent that is reasonably practicable, lighting systems should comply with Canadian Standards Association Industrial Lighting Standard 92-1-1967, as amended from time to time. In any event, minimum recommended levels of illumination on the task should be as shown in the following chart:

TABLE II
MINIMUM RECOMMENDED LEVELS OF ILLUMINATION

<u>Area/Operation</u>	<u>Footcandles</u>	(lux)
Reading instruments, gauges, etc., where errors could be the cause of a hazardous condition	80	(850)
Working with hazardous substances of severe or moderate hazard	70	(750)
General laboratory work of low hazard		
Medium or fine work	60	(650)
Rough work	30	(300)
Emergency shower locations	5	(50)
Emergency lighting	3	(30)

- 2.3.4 Floors - Floor coverings or finishes should resist liquid penetration, be easy to clean and resistant to slipping.
- 2.3.5 Doors - Doors should be sufficient in both number and size and so located as to allow quick emergency evacuation. Conspicuous markings on glass doors or panels, and vision panels on free-swinging solid doors, may eliminate certain traffic hazards.
- 2.3.6 Ladders and Floor and Wall Openings
- 2.3.6.1 Ladder installations should comply with American National Standards Institute A-14.3 Safety Code for Fixed Ladders, as amended from time to time.
- 2.3.6.2 Floor and wall openings and holes, as defined in the standard cited below, should be guarded as recommended by the American National Standards Institute in its Standard "Safety Requirements for Floor and Wall Openings, Railings and Toe-Boards" A-12.1, as amended from time to time.
- 2.3.7 Utilities
- 2.3.7.1 All piping systems should be clearly marked and available to inspection, with identification in accordance with CSA Standard B53 "Code for identification of Piping Systems".
- 2.3.7.2 Potable water systems should not be endangered by laboratory work. Great care is necessary to ensure that flexible or other temporary connections to potable systems do not prevent the proper function of protective devices such as vacuum breakers and backflow preventers in the permanent system.
- 2.3.7.3 Central vacuum systems should not be connected to zones which are potential sources of contamination and from which the system could spread the hazard. Radio-isotope and microbiology areas are such zones; vacuum requirements in these areas should be created by a separate vacuum pump in each room requiring the service.
- 2.3.7.4 All electrical installations and facilities in a laboratory or work place should comply with the recommendations of the Canadian Standards Association Standard C22.1 and amendments thereto, and be approved for use in accordance with that Standard, for the classification of the hazard in the work place.

- 2.3.7.5 Standby electrical power should be available for use in the event of a commercial power failure and should have capacity to supply at least emergency lighting plus any hazardous facilities such as ventilated animal cages, some incinerators and refrigerators, etc.
- 2.3.8 Emergency Equipment - Equipment as indicated hereunder should be provided to deal with emergency situations involving hazardous materials:
- (a) Emergency shower and/or eye wash equipment should be provided wherever there is a significant exposure to hazardous materials and a risk of skin or eye injury due to accidental splashes of such materials. The temperature of any connected water supply should not exceed 100°F (38°C).
 - (b) Emergency power facilities should be provided wherever, in hazardous areas, a failure of power supply would cause dangerous conditions.
- 2.3.9 Radiation Emitting Equipment - The design, construction, functioning, installation, maintenance, operation and use of x-ray, laser, microwave, ultrasound and ultraviolet radiation emitting equipment must comply with recommendations, safety codes and regulations issued by the Radiation Protection Bureau of the Department of National Health and Welfare (see Chapter 4).
- 2.3.10 Laboratory Furniture
- 2.3.10.1 All laboratory benches, tables, and cupboards should be secure against upset. Stools, if not fixed, should be solid and stable and adequate knee-space should be provided.
 - 2.3.10.2 Bench widths should be such that utility controls located at the back can be reached safely. Gangways between benches should be wide enough to permit safe movement in normal working conditions and quick escape in an emergency.
 - 2.3.10.3 Laboratory furnishings should be constructed of materials to suit the functional needs of the laboratory.
- 2.3.11 Equipment Safeguards - To the extent that it is reasonably practicable, all machines purchased for laboratory use should be so designated and constructed as to be safe. If an apparatus is a significant work hazard it should be fitted with a guard that will effectively prevent injury to any person.

- 2.3.12 Protective Shields - Suitable shields and barricades should be provided to protect laboratory personnel from the hazards of explosion, rupture of apparatus and systems from over-pressure, implosion due to vacuum, sprays or emissions of toxic or corrosive materials, or flash ignition of escaping vapours.
- 2.3.13 Safety Containers
- 2.3.13.1 Designs of chemical laboratories should incorporate provision of functional space and facilities for temporary storage and use of appropriate safety containers to facilitate safe disposal of waste liquids or materials for which discharge to a building drain is not acceptable (e.g. solvents, radioactive materials).
- 2.3.14 Static Grounding - Static bonding and grounding should be provided wherever flammable liquids are dispensed from containers of over 5-gallon (22.5 litre) capacity.
- 2.3.15 Warning Signs
- 2.3.15.1 Particular systems and facilities designed into a laboratory may require warning signs, or colour symbols, to represent hazard (e.g. chemical stores, radioactive and microbial filtration, perchloric exhaust components in penthouses and on a roof).
- 2.3.15.2 The design of any warning sign should stipulate the location and angle of disposition of the sign for clearest display, and call for such signs to be painted according to the established colour coding.
- 2.3.16 Biological Considerations for Design
- 2.3.16.1 Laboratory buildings for handling micro-organisms pathogenic for humans should be zoned into areas designated as (a) clean and (b) contaminated, separated by an air lock with an ultra-violet (UV) door barrier and ceiling-mounted UV lights.
- 2.3.16.2 Separate clean and contaminated change rooms, with an air lock between them, should be provided to serve as transitional areas through which personnel enter and leave the potentially infectious parts of the building. Shower facilities, or space for their future installation, and lockers for street clothing should be provided. The contaminated change room should contain a UV discard clothing rack and ventilated storage for laboratory shoes. Effluents from contaminated areas may require treatment.

- 2.3.16.3 The air pressure of the whole contaminated zone should be continuously negative in relation to the clean zone. Within the contaminated zone, the air pressure balance of rooms where infectious materials are handled should be further negative to corridors. Air from the contaminated zone should not be recirculated.
- 2.3.16.4 The water taps of sinks in the contaminated zone should be knee or blade activated. Lighting fixtures, pipes, conduits and other services should be designed and installed using seals where appropriate to preserve the biological separation between contaminated and clean zones.
- 2.3.16.5 Paints, coating and other finishes on floors, walls, ceilings and other surfaces should be resistant to wash-down or steam decontamination. Materials and equipment should be conducive to decontamination.
- 2.3.16.6 In designing the laboratory, consideration should be given to the full and proper use of ventilated microbiological cabinets, available in two basic types:
- partial barrier cabinets (including laminar flow units)
 - absolute barrier cabinets
 - the type selected for use should be decided upon after an assessment of the risk of the operation and the degree of hazard.

The minimum air flow across the opening of partial barrier cabinets should be 100 linear feet per minute (0.5 m/s). Absolute barrier cabinets are of gas-tight construction and operate at a constant negative air pressure; air exhausted from these cabinets and from other apparatus where microbial aerosols are involved should be filtered. Air filters should be installed in a manner permitting their decontamination in situ, or replacement, without hazard to employees.

2.3.17 Design of Animal Facilities

- 2.3.17.1 The laboratory animal area typically includes rooms for inoculation and autopsy, as well as rooms for holding infected animals. In all cases, safe working conditions for personnel

should be provided to prevent any potential hazard possible from undesired animal cross-infection. Where a high degree of isolation is required, individually ventilated cages should be provided to hold infected animals. In some instances, animals may be housed in cages under a UV light barrier. Non-portable ventilated animal compartments (Horsfall units) are recommended for housing animals exposed to or infected with highly infectious micro-organisms.

- 2.3.17.2 A large autoclave or steamer should be provided for sterilizing cages and racks and for passing these through to a washing room.
- 2.3.17.3 The heavier-than-air ammonia should be removed if possible, by introducing ventilating supply air near the ceiling and exhausting near the floor.

2.3.18 Laboratory Support Areas (Biological)

- 2.3.18.1 The laboratory support area should be located outside the contaminated zone. This includes rooms for holding healthy animals; for washings, final sterilizing and storing glassware and animal cages; and for preparing media and repairing laboratory equipment. Because many of the procedures are heat-generating and odour-producing, the ventilation system should be designed with care.
- 2.3.18.2 A waste collection treatment unit for treating liquid or solid wastes may be necessary in certain applications.

2.4 References

- "Handbook of Laboratory Safety",
The Chemical Rubber Company,
18901 Cranwood Parkway,
Cleveland, Ohio. 44128
- "Microbial Contamination Control Facilities",
Van Nostrand Reinhold Publishing Company,
1410 Birchmount Road,
Scarborough, Ontario.

"Accident Prevention Manual for
Industrial Operations",
National Safety Council,
425 North Michigan Avenue,
Chicago, Illinois. 60611

"Industrial Ventilation Manual",
American Conference of Governmental
and Industrial Hygienists,
1014 East Broadway,
Cincinnati, Ohio. 45202

"Threshold Limit Values",
1969 and Amendments,
American Conference of
Governmental and
Industrial Hygienists.

"Industrial Hygiene Practices Guide
for Laboratory Hood Ventilation",
American Conference of Governmental
and Industrial Hygienists.

"The Tuberculosis Diagnostic Laboratory",
Canadian Journal of Public Health,
Canadian Public Health Association,
125 Young Street,
Toronto 7, Ontario.

"Chemical Safety Data Sheets",
Manufacturing Chemists Association,
1825 Connecticut Avenue, N.W.,
Washington, D.C. 20009

Dominion Fire Commissioner,
Technical Information Bulletins.

CHAPTER 3

GENERAL SAFETY PRACTICES

This chapter sets out general safety practices for several areas of principal concern. It does not attempt to list all of the precautions and safety measures which may be required. More detailed information concerning these and other specific procedures and guidelines may be obtained from the appropriate references listed in this chapter.

3.1 Cryogenics

3.1.1 General

3.1.1.1 A cryogen is any refrigerant used to obtain a temperature lower than -58°F (-50°C). Potential hazards occur because cryogenic fluids are extremely cold, and in some processes very small amounts of liquids are converted into large volumes of gas. Liquids which boil at very low temperatures will condense oxygen from the air, which in turn creates an explosion or combustion hazard.

3.1.1.2 The user of cryogenic fluids should have a thorough knowledge of the characteristics of the gas at temperatures and pressures being used, and the appropriate safety precautions for the handling of the individual liquid. Particularly, users should know how to recognize and eliminate leaks, and what to do in the event of an explosion or implosion.

3.1.1.3 Only authorized and qualified personnel should have access to the storage area for cryogenic fluids. Gaseous or liquid oxygen should be kept in its own particular area, without any other gases being allowed except gaseous nitrogen and gaseous carbon dioxide. Liquid nitrogen should not be stored with helium, hydrogen or oxygen. Walls and floors of such storage areas should be concrete or reinforced concrete.

3.1.2 Hazards - Danger of fire and explosion exists with escaping cryogens such as oxygen and hydrogen. The danger is such that even materials normally non-combustible will ignite if allowed to become coated with an oxygen-rich condensate. Thermal shock to containers, or a gas pressure greater than the containers are designed to hold, may cause explosions. Implosions may result from pressures produced by cryo-pumping which are nearly equal to the existing atmospheric pressure on the equipment being used, unless this equipment is designed to withstand such pressure changes.

Structural or other material coming into contact with cryogenic fluids may become combustible, explosive, or subject to failure from strain or impact due to altered physical characteristics. Direct or indirect uninsulated contact with cryogenic fluids causes cold burns (frostbite); delicate surfaces, such as eyes, can be damaged by a brief exposure. With the exception of oxygen, rapid expansion of cryogenic fluids results in an oxygen deficient atmosphere if the immediate environment is inadequately ventilated; this can lead to asphyxiation.

3.1.3 Special Safety Precautions

- 3.1.3.1 Warning signs should be posted where cryogenics are stored or being used, and the name of the cryogenics should be shown.
- 3.1.3.2 Proper ventilation where cryogenics are stored or being used is required, to reduce the danger of explosion, fire or asphyxiation.
- 3.1.3.3 Vessels containing cryogenics should be thermally isolated from sources of heat. When not in use, containers used for the transport of cryogenic fluids should be secured with chains or straps to a substantial support, such as a wall or a fixed bench, to protect against upsets.
- 3.1.3.4 All vessels containing cryogenics should be provided with a vent or other approved safety device which permits the escape of excess pressure and vapors.
- 3.1.3.5 Containers should be filled only with the liquids that they were designed to hold. Each container should be labelled as to which cryogenic fluid it contains.
- 3.1.3.6 When pouring a liquid cryogen into a Dewar Flask or other container, a metal funnel should be used, and a face shield and insulated gloves should be worn.
- 3.1.3.7 Personnel should always stand clear of boiling or splashing cryogen, and perform operations slowly to minimize any boiling or splashing.
- 3.1.3.8 Vessels designed and constructed as containers for cryogenics should not be welded or heated while the vessel contains a cryogen.
- 3.1.3.9 Liquid nitrogen heavily contaminated with oxygen should be handled with precautions applicable to

liquid oxygen. The appearance of a blue tint in liquid nitrogen is a direct indication of oxygen contamination.

3.1.4 Personal Protection

- 3.1.4.1 Eyes and face should be protected with a face shield whenever there is a danger of injury from physical or chemical agents.
- 3.1.4.2 Gloves should be worn when handling anything that is or may have been in contact with a cryogenic liquid. Asbestos gloves are preferable, but leather gloves may be used. The gloves should fit loosely, so that they can be removed quickly (thrown off) if liquid spills or splashes into them.
- 3.1.4.3 A knee length laboratory coat with cuffless long sleeves, or a full length apron of non-porous material which fastens at the back, should be worn. Coats and aprons should have neither pockets nor cuffs.
- 3.1.4.4 Boots with tops sufficiently high to be covered by the trouser leg (which should be cuffless) should be worn.
- 3.1.4.5 An appropriate eye wash fountain or eye wash bottle and safety shower should be available.
- 3.1.4.6 Watches, rings, bracelets or other jewellery should not be worn by personnel handling cryogenics.

3.1.5 Cold Traps

- 3.1.5.1 Cold traps improperly employed can impair accuracy, destroy instrumentation and systems, and be a physical hazard. In addition, the slush mixtures frequently used in cold traps should be handled with care, because many are toxic and present explosive hazards that are not necessarily referred to in the literature.
- 3.1.5.2 Operations should always be performed slowly, to minimize boiling and splashing, when charging a warm condenser or inserting objects into a cryogenic liquid.
- 3.1.5.3 If liquid nitrogen is the coolant, the trap should be charged only after the system is pumped down. This is because liquid air containing oxygen can

condense in the trap, and a considerable amount of the liquid oxygen in it may also condense, creating a major hazard.

- 3.1.5.4 The trap should be suitably vented or exhausted, if the cooling bath is removed, so that any condensate which will then evaporate from the trap will not pressurize the system.

3.1.6 References

"Handbook of Laboratory Safety",
Chemical Rubber Company,
18901 Cranwood Parkway,
Cleveland, Ohio, 44128

"Liquefied Atmospheric Gases",
(Precautions and Safe Practices
for Handling),
February 1971, Form 9888-L,
Union Carbide Corporation,
123 Eglinton Street East,
Toronto, Ontario.

"Handling Cryogenic Fluids",
Neary, R.M. (1960),
Union Carbide Corporation.

"Liquefied Helium",
(Precautions and Safe Practices
for Handling, 1962),
Union Carbide Corporation.

"Liquefied Nitrogen",
(Technical Data, 1960),
Union Carbide Corporation.

"Gaseous Oxygen",
National Safety News,
Data Sheet D-472, December 1958,
National Safety Council,
North Michigan Avenue,
Chicago, Illinois. 60611

"Handbook of Compressed Gases",
Compressed Gas Association Inc.,
Van Nostrand Publishing Company,
1410 Birchmount Road,
Scarborough, Ontario.

"Personal Protective Equipment
Safety Standard", (TB STD 3-14),
Public Service of Canada.

3.2 Compressed Gas

- 3.2.1 General - A gas having a pressure in the container in excess of 40 psia (280 kPa) at room temperature, and a flammable liquid having a Reid vapor pressure exceeding 40 psia (280 kPa) at 100°F (38°C), are classified as compressed gases. They must be handled with care in all phases: storage, transportation, connection, use and disposal. All personnel who handle, manipulate or work in the presence of compressed gases should be made aware of the dangers of exploding cylinders, and the projectile-like behaviour of a cylinder under circumstances of a sudden pressure release. All personnel should be made aware of the physical, chemical and toxic properties of any gas used in the laboratory operation. Contracts and purchase orders should show the required CGA connection number for the cylinder to be supplied.
- 3.2.2 Cylinder Contents - Each cylinder should be logged in and out of the laboratory operation, recording the serial number stamped on the cylinder and the contents as received. Under no circumstances should attempts be made to alter the chemical composition of the cylinder contents by introduction of impurities. If the contents of a cylinder are not definitely known, the cylinder should be clearly labelled "contents unknown" and the supplier notified for disposal. Coding of cylinders varies among suppliers. Depending on the grade of the product contents, some suppliers choose to code by purity rather than chemical content. Colour codes may not be reliable indicators of cylinder contents.
- 3.2.3 Properties of Contents - Each person should be aware of the chemical, physical and physiological properties of gases used. Charts, listing characteristics of each gas and toxic thresholds, should be posted in a prominent location for reference and emergency situations. All toxic gases should be either used in, or vented into, a fume hood. All fume hoods so used should be marked accordingly, specifying the hazard. Cylinders should not be exposed to temperatures in excess of 120°F (50°C). Cylinders containing flammable or oxidizing gases should be used in locations having good ventilation.
- 3.2.4 Cylinder Handling - Misuse, abuse or mishandling of compressed gas cylinders may result in serious accidents. Observance of the following will help reduce the hazards:
- 3.2.4.1 Cylinders should be protected from cuts or abrasions and not allowed to drop or strike each other violently.

- 3.2.4.2 Cylinders weighing in excess of 40 lbs (18 kg) (total) should be transported by cart, properly retained in a vertical position.
- 3.2.4.3 Cylinders may be rolled on the bottom edge for short distances but should not be dragged.
- 3.2.4.4 Cylinders should not be transported without the valve protection cap securely in place.
- 3.2.4.5 Always assume cylinders to be full and handle them accordingly.
- 3.2.4.6 Oil and grease should never be permitted to come in contact with oxygen cylinder valves, regulators, hoses or associated equipment, nor should combustible substances be used as lubricants. The operator should ensure that there is no oil or grease on his hands, gloves or clothing.

3.2.5 Cylinder Storage

- 3.2.5.1 Cylinders should be stored in a secure, dry, well-ventilated area, clear of exit routes and fire exits, heat or ignition sources, and with valve protection caps securely in place.
- 3.2.5.2 Segregated areas should be defined according to cylinder content: flammable, oxidizing and inert.
- 3.2.5.3 Indoor storage areas for oxidizing gases should be separated from flammable gases and highly combustible materials by at least 20 feet (6.0 m), and by an approved fire-resistant partition.
- 3.2.5.4 Indoor ventilation should be provided at both floor and ceiling levels and conform to fire regulations.
- 3.2.5.5 Cylinders containing gases such as acetylene, liquified propane and liquified carbon dioxide should be stored upright.
- 3.2.5.6 Storage areas should be fitted with cylinder racks securely anchored to the wall at a height appropriate for the cylinder to be stored.
- 3.2.5.7 Cylinders should be individually secured to the storage rack, not more than two rows deep, using chains, straps or bars.

3.2.5.8 Full and empty cylinders should be stored separately, with the latter clearly identified as such.

3.2.6 Leaks - Leaking cylinders are hazardous and wasteful.

3.2.6.1 A contingency plan for leaking cylinders should be defined and known to all laboratory personnel in areas where compressed gases are used.

3.2.6.2 Where available, the faulty cylinder should be placed in a walk-in fume hood, the fume hood identified, and the supplier notified. Alternatively, the cylinder should be moved out of doors to a secure area to await disposal by supplier.

3.2.6.3 Some stem valves used on cylinders for low molecular weight gases such as hydrogen will leak when fully opened. Under no circumstances should any adjustment to the stem packing nut or pressure relief safety nut be even considered. Such actions are extremely hazardous, and are the responsibility of the supplier alone.

3.2.6.4 Leaks resulting from improper plumbing or worn fittings should be identified, using approved liquids or detection instrumentation. If wear is the reason for the problem, the components should be replaced.

3.2.6.5 Fittings should not be tightened beyond the manufacturer's specifications.

3.2.7 Regulators - Each person expected to use compressed gases should be instructed on the proper installation and use of regulators.

3.2.7.1 Cylinders of compressed gas should only be connected to regulators specified for use with the contents of the cylinder. C.G.A. regulations should be adhered to at all times.

3.2.7.2 The seat of the cylinder stem valve should be cleaned before coupling with the regulator. The stem valve should not be used to blow out the regulator fitting seat.

3.2.7.3 The regulator should be closed before coupling. Do not over-tighten the coupling nut from the regulator stem.

- 3.2.7.4 Once the regulator is installed, and before use or further connection to apparatus, the regulator-to-cylinder connections should be checked for leaks.
- 3.2.7.5 In addition to the use of liquid and detection instruments, the regulator can be used to detect leaks. Open the cylinder stem valve and note the pressure. Close the stem valve and wait 15 minutes. There will have been no pressure drop if the regulator/cylinder connection is leak-free.
- 3.2.7.6 A similar procedure can be applied to other portions of the gas plumbing to verify the integrity of the system. Should a leak be detected, close the cylinder stem valve.

Breathing Apparatus - Laboratories handling toxic gases must have appropriate personal protective equipment on hand in case of leaks or accidents. Self-contained breathing apparatus is preferred, but respirators with suitable fresh canisters may be acceptable, bearing in mind the nature of the gas and the possible concentrations.

3.2.8 References

- "Handbook of Laboratory Safety",
The Chemical Rubber Company,
18901 Cranwood Parkway,
Cleveland, Ohio. 44128
- "Handbook of Compressed Gases",
Compressed Gas Association Inc.,
Van Nostrand Reinhold Publishing
Company,
1410 Birchmount Road,
Scarborough, Ontario.
- "The Use and Handling of Compressed
Gases",
Bulletin 259, revised 1969,
U.S. Department of Labour,
U.S. Government Printing Office,
Washington, D.C. 20402.
- "Production, Storage and Handling
of Liquid Natural Gas", (2-276),
Canadian Standards Association,
77 Spencer Street,
Ottawa, Ontario.
- "Matheson Gas Data Book",
Matheson of Canada Limited,
Whitby, Ontario.

3.3 Glass

- 3.3.1 General - Standard safe practices, including the wearing of eye and face protection, are necessary in the handling and use of glass to prevent injuries or illnesses from explosions, ruptures from overpressure, implosion due to vacuum, spills, sprays or emission of toxic or corrosive materials, or flash ignition of escaping vapours.
- 3.3.2 Disposal - Broken or cracked glass should not be placed in waste bins designed to receive paper and other laboratory waste. A separate metal container, appropriately labelled, should be available for such use in each laboratory.
- 3.3.3 Storage Glass and glassware should be stored on shelves no higher than a person of average height can reach from floor level. Delicate pieces should be protected by storing in cartons clearly marked for easy identification. No item of glassware should protrude over the edge of shelving.
- 3.3.4 Selection of Glassware - When selecting a piece of glassware for use, care should be taken to ensure that it is designed for the type of work planned. For pressures even slightly above normal, pressure bottles should be specifically chosen, and vacuum flasks should be used for filtration with the aid of suction. Types of glass rods and tubing can be identified by refraction and comparison with approved standards. Where caustics are used, glass-to-teflon connections and stoppers (or suitable alternatives) may reduce hazards, especially in the reduction of seized joinings.
- 3.3.5 Setting up Apparatus - Apparatus (a combination of two or more units) should be set up with units adequately supported by clamps on stands. Laminated safety-glass protective shields should be placed around the apparatus to protect workers on both sides of the bench, if necessary.
- 3.3.6 Cutting Tubing and Rods - The ends of any glass piece cut in the laboratory should be squared and fire-polished prior to its employment. Protective hand covering should be used when working with glass rods and tubing.
- 3.3.7 Glass and Rubber or Cork Connections - The correct bore should be selected, so that the insertion can be made without undue force. The glass and stopper should be wet (water or glycerine). Appropriate hand and eye protection should be used. Extreme care should be exercised when removing a glass rod or tube that is stuck to a rubber stopper.

- 3.3.8 Heating of Glassware - Care should be taken to ensure that the type of glass to be used will withstand the heat to be applied. The heat source, and the method of heating to be used, should be selected carefully in relation to the liquid or material to be heated.
- 3.3.9 Glassware under Pressure or Vacuum - Heated pressure vessels should be shielded in case an accident occurs. Pressure should not be applied internally to a liquid in glassware to expel the contents. Personnel should be protected against implosion of evacuated glassware, using guards of wire screen or perforated metal.
- 3.3.10 Seized Glass-to-Glass Surfaces - During attempts to separate, extreme care and patience should be exercised and hands must be protected. Glass-to-teflon or other suitable alternatives may reduce hazards when caustics are used, as noted in 3.3.4.
- 3.3.11 Cleaning Glassware - Before cleaning glassware the user should ensure that each piece is free of any material that might present a hazard. The use of mild cleaners is preferred to strong acids or caustics. Should the latter be used, the glassware should be well rinsed and dried afterwards. Hand and eye protection should be stressed, and procedures devised which will reduce the hazards from possible breakage.
- 3.3.12 Transporting Glassware - To reduce the hazards from breakage during transport, special chemical-resistant metal or plastic containers of adequate size should be used to transport all bottles containing acids, alkalines, or other corrosive or flammable liquids. Desiccants under vacuum may be transported in a wooden box or metal shield; in such instances appropriate carrying tongs should be used when handling beakers and other glassware.
- 3.3.13 Labelling Bottles - All reagent bottles and other containers of laboratory chemicals should be clearly labeled and dated. A coat of clear lacquer applied to the label will protect it.
- 3.3.14 Ullage in Bottles - Bottles should be filled to not more than three-fourths of their capacity at room temperature.
- 3.3.15 Special Hazards - The handling of hazardous products in glass containers should be controlled by local laboratory directives.
- 3.3.16 References

"Guide for Safety in the Chemical Laboratory",
Manufacturing Chemists Association,
1825 Connecticut Avenue, N.W.,
Washington, D.C. 20009

"Laboratory Glassware",
Safety Education Data Sheet No. 23,
National Safety Council,
425 North Michigan Avenue,
Chicago, Illinois. 60611

"Bottles and Broken Glass",
Safety Education Data Sheet No. 355,
National Safety Council.

"Safety Measures in Chemical
Laboratories",
Third Edition - 1964,
National Chemical Laboratory,
Teddington, Middlesex, England.

"Handbook of Laboratory Safety",
The Chemical Rubber Company,
18901 Cranwood Parkway,
Cleveland, Ohio. 44128

"Dangerous Substances Safety
Standard",
(TB STD 3-2), Public Service of
Canada.

"Personal Protective Equipment Safety
Standard", (TB STD 3-14),
Public Service of Canada.

3.4 Instruments and Other Equipment

- 3.4.1 General - All instruments, and associated electrical equipment, should be inspected periodically for defects and replaced as necessary. The following review of the more common equipment will aid in determining which safety items to check on various types of equipment. Where good industrial laboratory practice prescribes it, personal protective equipment including hand, eye and face protection should be worn, as is appropriate to the hazard associated with the use of the various types of equipment.
- 3.4.3 Autoclaves - All autoclaves should be provided with interlocks to prevent the opening of the charging door until all pressure has been relieved. High pressure types should have integral explosion protection and control for safe operation.
- 3.4.3 Calorimeter Bombs - Adequate shielding as a protection against explosion should be used.

- 3.4.4 Centrifuges - Centrifuges should be of double-walled construction to prevent fly-aways, and equipped with a disconnect switch on the lid. The centrifuge should be located where vibration will not cause items to fall off nearby shelves. Exhaust ventilation should be provided, especially if flammables are to be centrifuged.
- 3.4.5 Chromatography Equipment - Insulation for radiation, and for ventilation to contain and remove hazardous vapor, should be provided.
- 3.4.6 Distillation Apparatus - Fail-safe devices should be used to guard against possible fluctuations or failure in water pressure and electrical power.
- 3.4.7 Fraction Collectors - Fraction collectors should be isolated from sources of ignition. Adequate ventilation is necessary and construction should be explosion proof.
- 3.4.8 Microtomes - A lock to prevent inadvertent operation, and a guard to protect the operator against the cutters, should be provided.
- 3.4.9 Paraffin Dispensers and Vacuum Infiltrators - An automatic over-temperature shut-off should be in series with the thermostatic control.
- 3.4.10 Ovens - Ovens used in service with explosive materials should be equipped with blow-out panels or magnetic latches which open at pressures slightly above one atmosphere. Forced draft ventilation, inert gas purging, exhaust ventilation or other appropriate means should be used, to prevent a build-up of explosive concentrations of vapour in ovens. Reliable, well-maintained and accurately calibrated thermostatic controls, with units clearly marked, should be used to prevent excessive heating. All controls should be designed to fail safe. Where an oven is supported by a table or counter, the counter or table top should be constructed of non-combustible material, or adequate ventilation should be provided between the supporting surface and the bottom of the oven.
- 3.4.11 Electrical and Electronic Instruments and Equipment - These should be inspected periodically for hazardous leakage currents, and repaired or replaced as necessary. The use of ground-fault circuit interruptors should be considered where electrical/electronic equipment is used in locations which increase the possibility of shock hazard.
- 3.4.12 Mercury Vapour - Mercury diffusion pumps, and any other equipment that produces mercury vapour, should be provided with exhaust ventilation.

3.5 Storage of Chemicals

- 3.5.1 General - Due to the wide range of chemicals and materials used in laboratories, good storage practice and reliable current inventory control is important. Neglect of the physical and chemical properties of stored materials may result in fires, explosions, emission of toxic gases, vapours, dusts or radiation, and various combinations of these effects. Care should be taken to provide separate storage or other special conditions, where required, for certain materials and chemicals including pesticides and herbicides. Since refrigerators are often used for the storage of highly volatile or reactive materials, it is essential that all controls, switches, etc. be explosion proof. A current inventory list of all chemicals in stock should be maintained, and each item should be identified as to its hazard in accordance with NFPA booklet 704.
- 3.5.2 Flammable Materials - Such materials should be stored in places that are cool and adequately ventilated. Continued liaison should be maintained with the local fire prevention authorities regarding the type and disposition of such materials.
- 3.5.3 Oxidizing Materials - These are not usually combustible, but will produce oxygen for accelerated burning of combustible material, and should be stored separately. Examples of classes of such compounds are organic and inorganic peroxides, oxides, permanganates, perchlorates, and chlorates.
- 3.5.4 Water Sensitive Materials - These are materials which react with water, steam or water solutions; examples are lithium, sodium, potassium, acid anhydrides, and concentrated acids or alkalis. Because many of these materials are flammable, it is essential that the advice of the office of the Dominion Fire Commissioner be obtained regarding the installation of automatic sprinkler systems in the storage area which houses them.
- 3.5.5 Acid Sensitive Materials - Such materials react with acid and acid fumes; examples are lithium, sodium, arsenic, selenium and cyanides. Acids should not be stored close to these materials.
- 3.5.6 Toxic Hazards - These are materials which under either normal or disaster conditions, or both, can be dangerous, e.g. carbon tetrachloride and materials which are toxic because of their radioactivity. In general, materials which are toxic as stored, or which can decompose into toxic components due to contact with heat, moisture, acids or acid fumes, should be stored in a cool, well-ventilated place, out of direct sunlight, away from areas of high fire hazard. Examples of toxic materials are mercury, benzene, carbon tetrachloride and other hydro-carbons, organic nitro compounds, and organic phosphate compounds.

CAUTION

A self-contained breathing device should be readily available where dangerous levels of noxious gases or vapours may be given off or created by stored chemicals.

3.5.7 Reference

"Handbook of Compressed Gases",
Compressed Gas Association Inc.,
Van Nostrand Reinhold Publishing
Company,
1410 Birchmount Road,
Scarborough, Ontario.

"Construction Safety",
Construction Safety Association
of Ontario,
74 Victoria Street,
Toronto, Ontario.

"Accident Prevention Manual for
Industrial Operations",
National Safety Council,
Chicago, Illinois. 60611

"Dangerous Properties of Industrial
Materials",
Van Nostrand Reinhold Publishing
Company,
1410 Birchmount Road,
Scarborough, Ontario.

"Handbook of Laboratory Safety",
The Chemical Rubber Company,
18901 Connecticut Avenue, N.W.,
Cleveland, Ohio. 44128

"Chemical Safety Data Sheets",
Manufacturing Chemists Association,
1825 Connecticut Avenue, N.W.,
Washington, D.C. 20009

"Fire Protection Engineering
Standards",
Dominion Fire Commissioner.

3.6 Environmental Chambers

- 3.6.1 The hazards of environmental chambers are related to exposure to heat and cold (heat exhaustion, heat stroke, frostbite and

skin burns, eye damage, respiratory tract damage), and exposure to toxic gases and fumes arising from test equipment within the chamber or from escaping refrigeration gases.

3.6.2 Safety Precautions - The following safety precautions should be followed with respect to environmental chambers.

3.6.2.1 Maintain outside surveillance of personnel working in environmental chambers, particularly those working alone. Continuous two-way communications should be provided where practicable.

3.6.2.2 Personnel should be advised of temperature ranges before entering, and provided with appropriate personal protective clothing and equipment.

3.6.2.3 An outside warning light should indicate when someone is in the chamber.

3.6.2.4 An emergency alarm system, audio and visual, that can be triggered off either inside or outside the chamber, should be available and tested periodically.

3.6.2.5 Gasket heaters should be installed where required, and used to prevent doors from freezing shut in low temperature rooms.

3.6.2.6 Safety devices such as exits and alarms, break-out tools, fire emergency equipment, emergency resuscitation, and first aid equipment should be provided, and personnel should be trained in their use.

3.6.2.7 Adequate ventilation should be provided.

3.6.3 References

"Cold Room Testing of Gasoline and Diesel Engines",
Data Sheet No. 465 of 1958,
National Safety Council,
425 North Michigan Avenue,
Chicago, Illinois. 60611

"Engineering Environmental Simulation Facilities", by T.R. Ringer,
National Research Council of Canada,
Ottawa, Ontario.
K1A 0R6

"The New Canadian Laboratory for
Arctic Testing", by J.L. Orr
and D.G. Henshaw,
National Research Council of Canada.

CHAPTER 4

RADIATION

- 4.1 This chapter sets out certain requirements concerning the design, operation and maintenance of laboratory and other facilities involved with the use of radioactive materials, X-ray emitting equipment, microwave, ultrasonic and laser radiating devices, and also the disposal of radioactive wastes. (Refer also to chapters 2 and 6.)
- 4.2 All new facilities, and all modifications and additions to existing facilities, should meet the specifications described in the following documents and their subsequent amendments, which have been produced by the Radiation Protection Bureau, Department of National Health and Welfare:
- | | |
|---|-------------------------|
| - X-Ray in Medical, Dental and Paramedical Diagnostic Radiology | - Publication RPD-SC-4 |
| - Microwave Heating Appliances | - Publication RPD-SC-6 |
| - Non-Medical Use of X-Rays | - Publication RPD-SC-7 |
| - Medical and Non-Medical Use of Lasers | - Publication RPD-SC-9 |
| - X-Rays in Medical Therapy | - Publication RPD-SC-10 |
| - Open Beam Microwave Equipment | - Publication RPD-SC-11 |
| - Laboratory Facilities for Handling Radioisotopes | - Publication RPD-SC-12 |
| - Methods for Radioactive Waste Disposal for Radioisotope Users in Canada | - Publication RPD-SC-15 |
| - Safety Procedures for the Use of Demonstration Laser Devices | - Publication RPB-SC-19 |
| - Active Metal Detector Safety Code | - Publication RPB-SC-18 |

Note: The foregoing documents do not cover all conceivable eventualities. Where assistance is required in interpretation or measurement, design or working techniques, departments should consult the Radiation Protection Bureau, Department of National Health and Welfare, Ottawa.

4.3 Radioactive Materials

- 4.3.1 Publication RPD-SC-15 specifies the concentration of radio-active material which may be disposed of by such routes as burial, discharge to municipal sewers, deposition in municipal dumps, incineration, etc., and summarizes the requirements.
- 4.3.2 Publication RPD-SC-12 divides laboratories into three types for considerations of design, according to quantity of radioactivity to be used, and gives detailed specifications for two of the more common of these. These specifications are aimed at ensuring that total radiation to which staff are exposed is within the limits recommended by the International Commission on Radiological Protection, and give details of the need and performance specifications for such items as fume hoods, sinks, separate drainage systems, storage areas, special surface finishes, enclosed service conduits, etc.

4.4 X-Ray Equipment and Facilities

Recommendations concerning the installation facilities, shielding and mode of use of x-ray equipment, are detailed in Publications RPD-SC-4, SC-7, and SC-10, with data included to aid the design of facilities of an acceptable standard. The x-ray equipment itself should conform to at least the minimum standards of design, construction and functioning detailed in regulations proclaimed under the Radiation Emitting Devices Act.

4.5 Microwave and Laser Equipment and Facilities

PRD-SC-6, SC-9, SC-11, and RPB-SC-18 and SC-19 provide requirements for microwave and laser equipment, facilities and mode of use, similar in scope to those of item 4.4.

4.6 Medical Surveillance

Members of the staff whose work involves their exposure to radio-active material or radiation are subject to medical surveillance, as specified in the Periodic Health Evaluation Standard, (TB STD 3-13) Public Service of Canada.

CHAPTER 5

MICROBIOLOGY

5.1 General

- 5.1.1 This chapter sets out suggested safety requirements for work carried out in microbiology laboratories. Due to rapid changes in technology and research, new or special situations may arise which require specific procedures or guidelines, additional to those in these guidelines. Such information may be obtained through the Medical Services Branch of the Department of National Health and Welfare, and from the appropriate references listed at the end of this chapter.
- 5.1.2 Micro-organisms which rarely cause disease in man, as well as those which commonly cause disease, should be handled with extreme care. Some micro-organisms considered avirulent with low dosage may recover virulence by mutation and passage through animals, and therefore must be treated as pathogens.
- 5.1.3 Biological products such as botulism, tetanus and diphtheria toxins are not infectious agents, but because they are potent chemical poisons they should be handled with extreme care. All biological samples of human origin, in particular blood and blood products, should be considered to be potentially hazardous, since even normal serum may carry agents such as hepatitis B virus. In handling specimens of human blood or blood products, it is of great importance that precautions be taken in the avoidance of mouth pipetting; in the care of the work area; in the decontamination of used glassware and unwanted test materials; in minimizing the production of aerosols of infectious materials; and in general personal hygiene.

5.2 Limited Access

- 5.2.1 Children under 12 years of age should be prohibited as visitors in microbiology laboratory areas. The degree of access by adults depends upon the risk associated with being in the area, and their need to be in the area.
- 5.2.2 Areas of high risk should be marked by appropriate signs such as "Caution - Keep Out" or "Infectious Area - Keep Out".

5.3 Immunization

- 5.3.1 Work involving exposure to hazardous micro-organisms may require prior immunization of staff, provided that a satisfactory vaccine is available.

5.4 Exposure to Teratogenic Agents

- 5.4.1 Women capable of child bearing should not be subjected to exposure to potential or known teratogenic agents.
- 5.4.2 Risk to pregnant women, of laboratory infection from any micro-organism, should be kept to a minimum because no information is available on the potential teratogenic effects of most micro-organisms.

5.5 Hazards

- 5.5.1 The degree of risk involved in working with pathogenic micro-organisms or their toxic products depends upon the worker's resistance, the portal of entry, the exposure time, the virulence of the micro-organism or potency of the toxin, and the total dose received. Situations where hazards arise include:
 - *CONTACT - when micro-organisms are spilled or splashed on the skin, reach mucous membranes, or gain entry into the body via cuts and abrasions.
 - *INHALATION - when micro-organisms are accidentally released in a fine spray, e.g. during a spill, during high speed grinding of infected tissues, and during centrifugation by improper means.
 - *INGESTION - when micro-organisms are transferred to the mouth by fingers, cigarette or pipe, or during consumption of food or drink.
- 5.5.2 The most frequently recognized causes of laboratory infections are: accidental oral aspiration of infectious material through a pipette, accidental inoculation with syringes and needles, animal bites, sprays from syringes and centrifuge accidents.
- 5.5.3 Attention is drawn to the high risk resulting from splattering or fine-spraying materials (particularly mucus) containing viable organisms when an overloaded loop is thrust into a flame. The violent rubbing of such materials (especially mucus) on glass slides, in order to make smears suitable for staining, is also a hazardous operation.
- 5.5.4 Certain procedures create larger amounts of aerosols than do others. Grinding tissue with mortar and pestle, decanting supernatant after centrifugation, resuspending packed cells, inserting a hot loop in a culture, withdrawing a culture sample from a vaccine bottle, opening a lyophile tube, streaking an inoculum on a rough agar surface, shaking and blending cultures in high speed mixers, and handling infected animals, are potentially dangerous operations if the micro-organisms are infectious.

5.6 Personnel Precautions

- 5.6.1 Personal cleanliness is an important barrier to infection. Neither smoking nor the consumption of food and drink should be permitted in areas in which pathogenic micro-organisms are being or recently have been handled.
- 5.6.2 No person with open wounds or exzematous conditions should be allowed to work with pathogenic micro-organisms, unless the risks involved can be obviated by protective clothing.
- 5.6.3 Suitable laboratory clothing should be worn in infectious disease laboratories. Street clothing should not be worn beneath laboratory clothing in risk areas, because the former may become contaminated in case of spills. Laboratory clothing worn in risk areas should be autoclaved before being sent to the laundry. Employees should reserve a separate pair of shoes for use only in the laboratory. The use of rubber gloves should be required when there is risk of the hands coming into direct contact with infectious micro-organisms, e.g. during autopsies. Aero-biological investigations involving infectious agents may require special procedures, including use of a ventilated hood system or respirators equipped with particular filters. All procedures and precautions should be approved by the responsible person in charge of each laboratory.

5.7 Safety Devices

- 5.7.1 Pipetting accidents, particularly those involving mouth pipetting, can be reduced in number by the use of pipetting devices available commercially. If used outside a safety cabinet, the pipetter should deliver by gravity flow rather than forceful ejection (which may produce fine sprays). Mouth pipetting should never be used for handling known infectious, or potentially infectious, materials.
- 5.7.2 Only syringes of the needle-locking (Luer-Lok) type should be used with infectious materials. Use should be made of a disinfectant-soaked pledget around the stopper and needle when removing infectious material from a rubber-stoppered vaccine bottle. Excess fluid and bubbles from a syringe should be expelled vertically into a cotton pledget soaked with disinfectant, or into a small bottle of cotton.
- 5.7.3 It is possible to protect against the dissemination of infectious materials into the environment by the use of the bacteriological safety cabinet; all potentially infectious operations are then carried out behind glass, with ventilation sweeping away contaminated air. The decision as to whether a cabinet is to be used will depend upon the micro-organism, the technique, the seriousness of the possible illness and its

possible sequelae, and the relative isolation of the laboratory. A cabinet should also be used when there is the potential of repeated inhalation of large volumes of non-pathogenic micro-organisms, because these occasionally give rise to hypersensitivity.

- 5.7.4 Screw-capped safety cups should be used when centrifuging highly infectious material in an open laboratory area. Small, tabletop model centrifuges can be used to handle infectious material if the centrifuge is operated in a safety cabinet. Glove ports should be covered, because the operating centrifuge may create strong air currents that could result in escape of infectious materials.
- 5.7.5 Shielded loop sterilizers, either flame or electrically-heated, should be used where highly infectious and dangerous agents are being handled. An inexpensive alternative is to have available containers of disinfectant in which loops are washed prior to flaming.

5.8 Animal Handling

- 5.8.1 Experimentally-infected small animals can be a source of infectious fine sprays. Such animals are more safely housed in cages with solid bottoms and sides than in wire cages. If highly infectious agents are used, the experimental animals should be housed in ventilated cages or cabinets (Horsfall Units), in which all input and exhaust air is filtered.
- 5.8.2 All cages holding animals inoculated with infectious substances should be labelled accordingly.
- 5.8.3 Careful handling procedures should be developed and employed to minimize the dissemination of dust from cage refuse and animals.
- 5.8.4 When animals are injected with pathogenic material, the animal caretaker should wear protective gloves and the laboratory worker should wear surgical gloves. Heavy gloves should be worn when feeding, watering or removing infected animals. Handling of monkeys requires special precautions.
- 5.8.5 Infected animals to be transferred to another building should be placed in containers that are impervious to fine sprays.
- 5.8.6 Autopsy of animals inoculated with highly infectious agents should be carried out in ventilated safety cabinets.
- 5.8.7 Effective poison should be placed in animal rooms to dispose of escaped rodents.
- 5.8.8 Dead animals should be placed in leakproof containers and incinerated.

5.9 Disinfection and Sterilization

- 5.9.1 All infectious or toxic materials, equipment or apparatus should be autoclaved or otherwise sterilized or detoxified, before being washed or discarded.
- 5.9.2 As soon as possible, all contaminated materials should be placed in covered discard pans suitable for autoclaving, and autoclaving should be carried out as soon as practicable.
- 5.9.3 Contaminated delicate equipment which will not withstand steam or the high temperature of autoclaving may be decontaminated by properly controlled ethylene oxide sterilization. Care should be taken to avoid damaging rubber, plastic and neoprene components of the equipment, which are liable to deterioration or destruction due to the gas.
- 5.9.4 Floors, laboratory benches and other surfaces in buildings in which infectious substances are handled should be disinfected as often as deemed necessary by the supervisor and the safety officer. Water used to mop floors should contain a disinfectant. The liquid seal of floor drain traps should be treated routinely with a suitable disinfectant.
- 5.9.5 Stock solutions of suitable disinfectants should be maintained in each laboratory.
- 5.9.6 Contaminated rubber gloves should be cleaned in disinfectant before removal from the hands, preparatory to decontamination.

5.10 Plan for Emergencies

- 5.10.1 Every laboratory working with pathogens should develop an emergency plan, approved by the person in charge, which is to be followed in the event of an accident.
- 5.10.2 The officer in charge of the laboratory should ensure that everyone in the laboratory is thoroughly familiar with the hazards associated with the work, and with the emergency plan developed as a safeguard in the event of an accident.
- 5.10.3 The laboratory supervisor should be notified immediately after an accident has occurred.
- 5.10.4 In case of spills, the affected area should first be covered carefully with an absorbent paper that has been soaked in a strong disinfectant solution.

- 5.10.5 For spills and splashes likely to produce a dangerous fine spray, steps should be taken to contain the hazard and to protect personnel. No one should enter the room until the extent of the hazard has been determined, except to save life. Protective clothing, including a respirator equipped with a particulate filter, should be worn during clean-up if the work is being done in a hazardous situation.

5.11 Handling of Various Agents

- 5.11.1 A classification of various etiologic agents according to hazard as a characteristic of the micro-organisms themselves is presented in Appendices A, B, C and D. In this classification, the least hazardous is designated as Precaution Category A.
- 5.11.2 The degree of hazard presented by a particular operation depends not only on the etiologic agent, but also on the nature of the operation. For example, in studies involving passage through animals, fine sprays, and infection of arthropods, the hazard involved in handling the agent is markedly increased over that associated with strictly in vitro work.
- 5.11.3 Masks should be worn except when the work is done in sealed cabinets in rooms with isolated ventilation systems having exhaust control.
- 5.11.4 Masks should be worn except when the work is done in sealed cabinets in rooms with isolated ventilation systems having exhaust control.
- 5.11.4 Appendix E sets out recommended operational requirements for safe handling of the various micro-organisms classified in Appendices A-D inclusive.

5.12 Special Measures

- 5.12.1 "Geographic Isolation" refers to the need for carrying out the work in a separate room or building in which no other work is currently conducted. A system that prevents recirculation of air is required. Exhaust air is passed through HEPA filters or incinerated.
- 5.12.2 "Controlled Access" refers to the exclusion of extraneous persons from the area of work.
- 5.12.3 "Other Special Clothing or Guards" includes particular safety measures to be taken when working with certain very hazardous agents. The Safety Officer should be consulted to determine specific measures.

- 5.12.4 "Special Precautions with Work Involving Insects and Animals" include ensuring that containment facilities are secure before work is begun. Special protective equipment should be used to protect personnel against the hazards of handling excretions and secretions of infected animals and insects.
- 5.12.5 "Special Aerosol Precautions" include operating centrifuges, blenders and other equipment in safety cabinets.
- 5.12.6 "Immunization Required" includes certain etiologic agents for which vaccines may be available.

5.13 References

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5600 Fisher's Lane,
Rockville, Md. 20852, U.S.A.

"Microbial Contamination Control Facilities",
Van Nostrand Reinhold Publishing Company,
1410 Birchmount Road,
Scarborough, Ontario.

"Handbook of Laboratory Safety",
The Chemical Rubber Company,
18901 Cranwood Parkway,
Cleveland, Ohio. 44128

"B.W. Safety Manual",
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Defence Research Board,
125 Elgin Street,
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"Laboratory Safety at the Center
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U.S. Department of Health, Education
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U.S. Government Printing Office,
Washington, D.C. 20402

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U.S. Department of Health, Education
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"Dangerous Substances Safety Standard",
(TB STD 3-2), Public Service of Canada.

"Personal Protective Equipment Safety
Standard",
(TB STD 3-14), Public Service of Canada.

"Hazardous Confined Spaces Safety Standard",
(TB STD 3-7), Public Service of Canada.

"Periodic Health Evaluations Standard",
(TB STD 3-13), Public Service of Canada.

APPENDIX "A"

INDEX TO OPERATIONAL REQUIREMENTS - BACTERIA

Organism No.	Name	Precaution Category
1	Actinobacillus - all spp. except A. mallei	B
2	Actinobaccillus mallei	X
3	Actinomyces - all spp.	B
4	Aeromonas salmonicida	B
5	Arizona arizonae - all serotypes	B
6	Bacillus anthracis	W
7	Bartonella - all spp.	J
8	Bordetella - all spp.	B
9	Brucella - all spp.	X
10	Clostridium botulinum	P
11	Clostridium tetani	E
12	Clostridia - other spp.	B
13	Corynebacterium diphtheriae	E
14	Corynebacteria - other spp.	A
15	Erysipelothrix indiosiosa	B
16	Haemophilus ducreyi, H. gallinarum, H. influenzae	B
17	Herellea vaginicola	A
18	Klebsiella - all spp.	H
19	Leptospira - all spp.	B
20	Listeria - all spp.	H
21	Mima polymorpha	A
22	Mycobacterium avium, M. bovis, M. tuberculosis	L
23	Mycobacteria - other spp.	B
24	Mycoplasma - all spp.	N
25	Neisseria gonorrhoeae, N. meningitidis	B
26	Pasteurella pestis, P. tularensis	W
27	Pasteurella - other spp.	B
28	Pseudomonas pseudomallei	X
29	Salmonella typhi	E
30	Salmonella - other spp.	B
31	Shigella - all spp.	B
32	Sphaerophorus necrophorus	B
33	Staphylococcus aureus	B
34	Streptobacillus moniliformis	B
35	Streptococcus agalactiae, S. equi, S. equisimilis, S. pneumoniae, S. pyogenes of Lancefield's groups A, B, C, G	B
36	Treponema pallidum, T. pertenue, T. carateum	B
37	Vibrio comma	E
38	Vibrio fetus	B
39	Yersinia enterocolitica	B

APPENDIX "B"

INDEX TO OPERATIONAL REQUIREMENTS - PARASITES

Organism No.	Name	Precaution Category
40	<i>Enchinococcus granulosus</i> , <i>E. multilocularis</i>	C
41	<i>Leishmania braziliensis</i> , <i>L. donovani</i> <i>L. mexicana</i> , <i>L. tropica</i>	J
42	<i>Naegleria gruberi</i>	H
43	<i>Plasmodium falciparum</i> , <i>P. malariae</i> , <i>P. ovale</i> <i>P. vivax</i>	D
44	<i>Pneumocystis carinii</i>	Q
45	<i>Shistosoma Haematobium</i> , <i>S. japonicum</i> , <i>S. mansoni</i>	F
46	<i>Taenia solium</i>	B
47	<i>Toxoplasma gondii</i>	Q
48	<i>Trypanosoma cruzi</i>	J
49	<i>Trypanosoma gambiense</i> , <i>T. rangeli</i> , <i>T. rhodesiense</i>	B

APPENDIX "C"

INDEX TO OPERATIONAL REQUIREMENTS - VIRUSES, RICKETTSIAE, BEDSONIAE

Organism No.	Name	Precaution Category
50	Adenoviruses - all types	H
51	Arboviruses - general	U
52	B virus	Y
53	Coxsackie A & B - all types	H
54	Cytomegalovirus	B
55	Echoviruses - all types	B
56	Encephalomyocarditis virus	H
57	Hepatitis - infectious and serum	H
58	Herpes viruses - except B	H
59	Infectious bronchitis - like virus	H
60	Influenza virus - all types	H
61	K virus	L
62	Langat	O
63	Lassa virus	ZZ
64	Marburg virus	ZZ
65	Measles virus	E
66	Murine viruses - including ectromelia, LCM murine hepatitis	N
67	Mumps virus	E
68	Newcastle disease virus	B
69	Polioviruses	I
70	Psittacosis, LGV	R
71	Rabies virus - fixed & attenuated	B
72	Rabies virus - Street	P
73	Reoviruses	E
74	Respiratory syncytial virus	H
75	Rhinovirus	B
76	Rickettsiae - except R. prowazeki and Coxiella burneti	V
77	Rickettsia prowazeki and C. burneti	Z
78	Rubella	E
79	Simian viruses - except B virus and marburg	G
80	Smallpox viruses, major and minor	Z
81	Tacaribe group viruses, except Tamiami	ZZ
82	Tamiami virus	H
83	Tick-borne viral encephalitis (Russian Spring- Summer encephalitis and all other viruses of complex except Langat)	T
84	Vaccinia	L
85	Varicella	G
86	Venezuelan encephalitis virus	Z
87	Vesicular stomatitis and other rhabdoviruses	S
88	Yellow fever virus	T

APPENDIX "D"

INDEX TO OPERATIONAL REQUIREMENTS - FUNGI

Organism No.	Name	Precaution Category
89	Blastomyces dermatidis	K
90	Cryptococcus neoformans	K
91	Paracoccidiosis	K
92	Histoplasma capsulatum	M
93	Coccidioides immitis	M
94	Sporothrix schenckii	K

APPENDIX "E"
OPERATIONAL REQUIREMENTS FOR SAFE LABORATORY HANDLING OF HAZARDOUS MICRO-ORGANISMS

Precautio Category	Geographic Isolation	Controlled Access	Negative Air Pressure	Hoods and Cabinets	Disinfect work area	Pipetting required	Special Protective Equipment	Gloves	Masks	or Guards	Special Clothing	Special Equipment involving Insects	Special Precautions with work Animals	Special Precautions (Centrifuge, Blender, etc.)	Immunizations required	Organisms Requiring these Precautions
A					+											14, 17, 21
B					+											1, 3, 4, 5, 8, 12, 15, 16, 19, 23, 25, 27, 30, 31, 32, 33, 34, 35, 36, 38, 39, 46, 49, 54, 55, 68, 71, 73, 75
C					+											40
D					+							+				43
E					+							+			+	11, 13, 29, 37, 65, 67, 78
F				+	+			+								45
G				+	+											79, 85
H				+	+									+		18, 20, 42, 50, 53, 56 57, 58, 59, 60, 74, 82
I				+	+								+			69
J				+	+											7, 41, 48
K		+		+	+											89, 90, 91, 94
L		+		+	+											22, 61, 84
M			+	+	+											92, 93
N				+	+											24, 66
O				+	+											62
P				+	+				+							10, 72
Q				+	+				+							44, 47
R		+		+	+											70
S		+		+	+											87
T		+	+	+	+											83, 88
U		+	+	+	+											51
V		+	+	+	+											76
W		+	+	+	+											6, 25
X		+	+	+	+											2, 9, 28
Y		+	+	+	+											52
Z		+	+	+	+											77, 80, 86
A-A		+	+	+	+											63, 64, 81

CHAPTER 6
CONTROL, HANDLING, AND DISPOSAL OF LABORATORY WASTES

6.1 Procedures and Regulations

- 6.1.1 All waste should be controlled, handled and disposed of in a manner which will not cause injury to employees or the public, or damage to property, and in compliance with applicable Municipal, Provincial and Federal Regulations or requirements.
- 6.1.2 Any procedures, directives, regulations or standards issued by a department or other authority having specific jurisdiction in respect to the control, handling or disposal of laboratory wastes (Fisheries and Environment Canada, Atomic Energy Control Board, etc.) shall take precedence over these guidelines.

6.2 Identification of Disposals

- 6.2.1 The level of hazard of disposable materials should be identified on a label in four categories of health, fire, reactivity and environment, by reference to Fisheries and Environment Canada "Code of Good Practice for Management of Hazardous and Toxic Waste at Federal Establishments". Abbreviated definitions of the degree of hazard in each category follow.

Health

- 4. Short exposure may cause death or major injury.
- 3. Prolonged or repeated exposure may cause serious injury.
- 2. Concentrations may be toxic.
- 1. No known health hazard.

Fire

- 4. Very flammable gases or volatile liquids.
- 3. Liquids and solids which will burn readily under normal conditions.
- 2. Substances which must be heated before ignition can occur.
- 1. Substances which will not readily burn.

Reactivity (Stability)

4. Readily detonates or explodes.
3. Can detonate or explode but requires strong initiating force or heating under confinement.
2. Mild reaction, unlikely to be hazardous.
1. Normally stable.

Environment

4. Substances which cause major residual damage.
3. Substances which could cause serious damage.
2. Intense or continuous application could cause residual damage.
1. No environmental hazard.

6.2.2 When labelling a material with respect to hazard, consideration should be given to hazards arising from contact with other substances during disposal, and hazards produced by the disposal procedure. The material should be labelled according to the highest hazard which might be encountered from it during disposal.

6.3 Storage and Disposal

- 6.3.1 The collection and segregation for disposal of all waste originating within a department's laboratories, offices, and workshops, and the disposal of all unidentifiable waste, remains the responsibility of that department, through the person in charge.
- 6.3.2 The individual scientist or laboratory technician is responsible for rendering safe what are considered hazardous materials before placing them in the collection area for pickup or disposal.
- 6.3.3 When explosive or poisonous materials are synthesized in a laboratory, the product should be identified prior to disposal.
- 6.3.4 Where the disposal of wastes presents special problems (e.g. emission of poisonous gases when being burned), detailed procedures and instructions on their disposal should be specified for the person responsible for the actual disposal.

- 6.3.5 Waste materials should not be accumulated in laboratories or storage areas. Particular attention should be given to those materials that tend to develop explosive properties over a period of time, and to those materials bearing a date beyond which the material should not be retained.
- 6.3.6 Combustible Waste - This waste should be kept in a storage locker which is not adjacent to buildings. The storage locker should be of fire resistant material, well ventilated, and marked as follows "Flammable Material - Danger - Keep Away", and/or in accordance with applicable standards provided by the office of the Dominion Fire Commissioner. The storage lockers should be equipped with suitable locks.
- 6.3.7 Solid Waste - This is best divided into three classes:
- (a) Glass
 - (b) Combustibles
 - (c) Non-combustibles (excluding glass)
- Suitably lettered and colour-coded containers are a convenient method of providing receptacles for solid waste. However, care should be taken not to introduce heated or unstable materials without removing the hazard, i.e. they should be cooled or decomposed.
- 6.3.8 Venting of Gaseous Waste - The emptying of gas cylinders can be very hazardous, and in most cases the advice of a Scientist, a Laboratory Technician or a Safety Officer should be sought beforehand. In venting gaseous waste products from a reaction, arrangements should be made for the gas either to enter the fume extraction system or to be led directly outside the building. Care should be taken to ensure that the system can deal with the waste products, and produce an effluent that is toxicologically acceptable.
- 6.3.9 Liquid Wastes - Materials immiscible with water, flammable liquids or solutions containing cyanides and chromates, should never be discarded into drains or ditches. Incompatible materials should be kept separately and disposed of separately. Random bulking of waste liquids can be very dangerous.

Some wastes may be disposed of by diluting with sufficient water and flushing into the sewage system. Materials that can be disposed of in this way should be so designated, by the person in charge. Used oils and hydrocarbons may have commercial value and, if so, should be stored in suitable receptacles for ultimate disposal. Oil that is highly contaminated (i.e. more than thirty per cent by volume) with

solvents or other chemicals, or with extremely hazardous materials at any concentration, should be classified as chemical waste and handled accordingly).

- 6.3.10 Burning - The burning of material for disposal should be carried out in an approved incinerator. The Environmental Protection Service (EPS) will provide assistance to individual facilities in developing handling procedures for, and disposal of, hazardous and toxic waste by open pit burning.

6.4 Additional Information

For further information on the hazards of a specific chemical substance and recommendation for its disposal as a laboratory waste, reference should be made to the Environmental Protection Service of Fisheries and Environment Canada; and to the Laboratory Waste Disposal Manual, Second Edition (1969) published by the Manufacturing Chemists Association, Washington, D.C.

6.5 References

"Laboratory Waste Disposal Manual",
Manufacturing Chemists Association,
1825 Connecticut Ave. N.W.,
Washington, D.C. 20009

"Precautionary Labeling of Hazardous
Chemicals",
Manufacturing Chemists Association.

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"Poisons: Properties, Chemical Identification,
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Vincent J. Brookes and Morris B. Jacobs,
2nd Edition, 1958,
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1410 Birchmount Road,
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"Dangerous Properties of Industrial
Materials",
N. Irvings Sax, 3rd Edition,
Van Nostrand Reinhold Publishing
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"National Fire Codes" (Vol. 15-1975),
National Fire Prevention Association,
470 Atlantic Avenue,
Boston, Mass. 02210

"Code of Good Practice for Management of
Hazardous and Toxic Waste of Federal
Establishments",
Environmental Protection Service,
Fisheries and Environment Canada.

"Code of Good Practice for Handling Solid
Waste at Federal Establishments",
Environmental Protection Service,
Fisheries and Environment Canada.

CHAPTER 7

FIRST AID - HEALTH AND MEDICAL SERVICES

- 7.1 The provisions of first aid facilities, and the training of employees in first aid, should follow the requirements outlined in the "First Aid Standard (TB STD 3-5) - Public Service of Canada". All other applicable and authorized standards, or special instructions concerning first aid equipment and procedures particular to each laboratory operation, should be available for reference by laboratory staff.
- 7.2 Where it has been determined that special first aid facilities, supplies and training are required, advice and arrangements for such supplies or training should be obtained through the nearest Regional Medical Services office of the Department of National Health and Welfare.
- 7.3 Laboratory employees are subject to periodic health evaluations where required, in accordance with the "Periodic Health Evaluation Standard (TB STD 3-13) - Public Service of Canada".
- 7.4 Suspected or potential health or environmental hazards in laboratories should be investigated in accordance with the procedures outlined in TB PROC. 4-2 (page 193 of this handbook).

CHAPTER 8

FIRE PREVENTION AND EMERGENCY PROCEDURES

- 8.1 Fire prevention and protection in the Public Service is under the jurisdiction of the Dominion Fire Commissioner.
- 8.2 Measures concerning fire prevention and protection should be in compliance with the National Fire Codes of the National Fire Prevention Association, Fire Protection Technical Information Bulletins and the Fire Protection Engineering Standards issued by the Dominion Fire Commissioner. It is the responsibility of the person in charge to ensure that all possible precautions are taken to prevent fires and explosions.
- 8.3 Where specific hazards may require emergency evacuation of staff, or other special safety measures, a disaster plan should be developed and approved by or in cooperation with the person in charge. This plan should be updated as necessary, and evacuation and/or disaster procedures should be rehearsed on a regular basis.

SAFETY GUIDE
FOR
OPERATIONS OVER ICE

TB GUIDE 5-3

SAFETY GUIDE FOR OPERATIONS OVER ICE

CHAPTER 1

Introduction

1.1 General

- 1.1.1 Ice covers are used for transportation routes, as a surface on which structures can be erected, and for the temporary storage of materials.
- 1.1.2 This Guide is concerned primarily with fresh water ice bridges, which are intended to support a gross vehicle weight of no more than 25 tons (22.5 tonnes). An ice bridge can be a natural untouched ice cover, a built-up, or a combined reinforced and built-up crossing route.
- 1.1.3 When loads are expected to exceed 25 tons (22.5 tonnes) or when operations will be conducted over salt water ice covers, advice should be sought from the Geotechnical Section, Division of Building Research, National Research Council of Canada, Ottawa, Ontario, K1A 0R6.
- 1.1.4 Information on the safe use of ice covers for aircraft operations is available from Transport Canada.

1.2 Purpose

- 1.2.1 The purpose of this safety Guide is to:
 - (a) specify rules of good safety practice for all Public Service employees engaged in operations on ice covers;
 - (b) provide information on the thickness of ice required to support moving and stationary loads;
 - (c) specify methods for determining ice thickness and quality; and
 - (d) outline approved methods for the preparation and maintenance of ice bridges.

CHAPTER 2

Properties of Ice Covers

2.1 Ice Formation

2.1.1 Ice forms on fresh water when the surface temperature falls to zero degrees Celsius, or at lower temperatures if dissolved impurities are present. While the underside of the ice cover in contact with the water will remain close to the melting temperature, solar radiation, wind speed, snow cover, wave action, currents, and the size and depth of the water body. Generally, small lakes and slow-moving streams freeze over earlier than larger lakes or fast moving streams.

2.1.3 While there are many different types of ice, the two types of major concern are:

- (a) clear ice - formed by the freezing of water;
- (b) snow ice - formed when water-saturated snow freezes on top of ice, making an opaque white ice which is not as strong as clear ice.

2.2. Ice Colour

2.2.1 The colour of ice, which may range from blue to white to grey, provides an indication of its quality and strength:

- (a) clear blue ice is generally the strongest;
- (b) white opaque ice (snow ice) has a relatively high air content, and its strength depends on the density: the lower the density the weaker the ice; but high density white ice has a strength approaching that of clear blue ice;
- (c) grey ice generally indicates the presence of water as a result of thawing, and must be considered highly suspect as a load-bearing surface.

2.3 Ice Thickness

2.3.1 The other major factor determining the bearing capability of ice is its thickness. Care must be taken when determining the thickness of ice covers to ensure that the readings are properly taken and are an accurate representation of the area under consideration.

- 2.3.2 Currents have a distinct bearing on the temperature required to form ice. Rivers and channels with strong currents may remain open all winter despite low air temperatures. Springs can cause currents, and also be the source of warmer water; currents can also cause variations in ice thickness without changing the uniform surface characteristics.
- 2.3.3 When selecting the site of an ice bridge, currents and springs should be located and avoided. Frequent checks of the ice thickness should be made in areas suspected of being affected by currents.
- 2.3.4 Ice under an insulating snow blanket thickens very slowly even in low temperatures. A heavy snow cover, before significant ice growth, may cause the ice to remain unsafe throughout the winter.

CHAPTER 3

Bearing Capability of Ice

3.1 General

- 3.1.1 The load bearing capacity of ice covers depends on the quality of ice, its thickness, ice and air temperatures, temperature changes and solar radiation.
- 3.1.2 Clear blue ice is the standard of quality against which other types of ice are compared. White opaque ice, or snow ice, is normally considered to be only half as strong.
- 3.1.3 Ice covers may consist of alternate layers of clear ice and snow ice, and each layer should be measured so that the effective thickness may be calculated. For example, an ice cover with a total thickness of 8 inches (20 cm) consisting of a 4 inch (10 cm) layer of snow ice would have an effective thickness of 6 inches (15 cm).
- 3.1.4 The strength of ice is generally increased by low temperatures. The increase is progressive from zero to minus eighteen degrees Celsius and remains fairly constant below this point. However, a marked drop in temperature can temporarily cause internal stress in an ice cover and reduce its bearing capacity. This can often occur during overnight periods when the temperature is much lower than the preceding average for the day.
- 3.1.5 The removal of snow from an ice cover during periods of low temperature has an effect similar to a marked temperature drop. The bearing capacity of ice should be considered to be reduced by 50 per cent for 24 hours after these conditions.

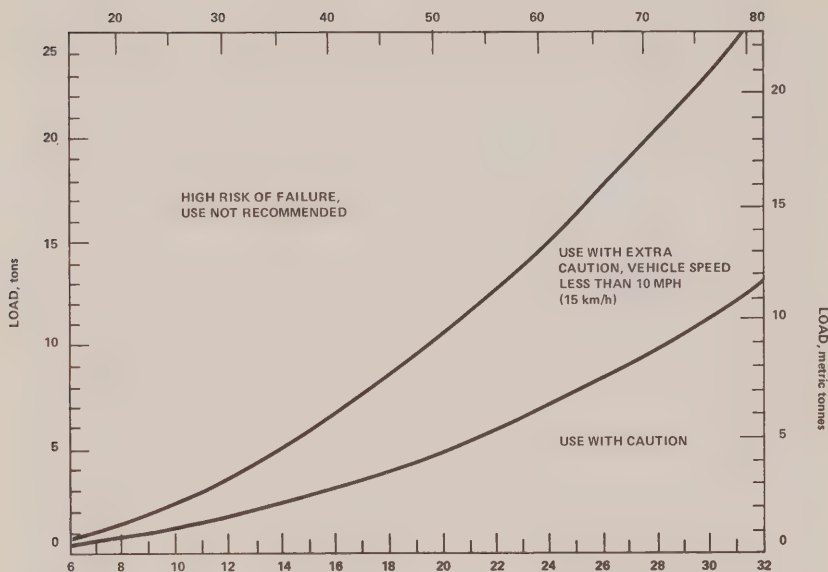
3.2 Determining Ice Thickness

- 3.2.1 Prior to use, the ice should be measured to determine whether its effective thickness is adequate to support the expected load. The graph presented in Figure 1 should be used as a guide to the required thickness for the loads involved.
- 3.2.2 To initially determine effective ice thickness, the rule of thumb "one inch (2.5 cm) of clear blue ice for every thousand pounds (450 kg)" may be used.

CAUTION

Ice that is less than six inches (15 cm) thick should not be used for any crossing. Because of natural variations, thickness may be less than 2 inches (5 cm) in some areas.

THICKNESS OF GOOD QUALITY FRESH WATER ICE, cm



THICKNESS OF GOOD QUALITY FRESH WATER ICE, inches

The allowable load should be reduced by one half for operations on white opaque ice.

RECOMMENDED BEARING CAPACITY BASED ON EXPERIENCE

FIGURE 1

- 3.2.3 The effective thickness can vary considerably in an ice cover. In particular, dangerously thin areas can occur due to currents in the covers of rivers and estuaries, and on lakes near the inlet or outlet of rivers and streams. Careful attention should be given to reduced ice thickness close to shorelines and around ridges and leads.
- 3.2.4 The thickness can be determined by drilling test holes spaced at a maximum of 50 feet (15 m) apart in rivers, and 100 feet (30 m) apart on a lake.
- 3.2.5 Crossings should be checked for ice thickness once a week when average air temperatures vary between -15 and -5 degrees Celsius; and daily when the temperature is above -5 degrees Celsius. Checks can be less frequent when ice thickness substantially exceeds requirements. A new hole should be drilled for each ice measurement.
- 3.2.6 Ice that is no longer supported by water, due to lowering water levels, may be too weak to support the loads to be applied; conversely, a rising water level can result in the formation of two ice layers with an intervening water layer. Ice thickness tests will reveal these conditions.

3.3 Parked and Stationary Loads

- 3.3.1 Ice behaves elastically under moving loads; that is, the ice is depressed while loaded but recovers its original position after the load has passed.
- 3.3.2 With a stationary load the ice surface will sag continuously and may fail, depending on the strength of the ice cover. The safe bearing capability for stationary loads should be considered to be 50 per cent less than that for moving loads.
- 3.3.3 The sequence of failure for stationary loads is as follows:
 - (a) radiating cracks form at the bottom of the cover immediately beneath the load (and ultimately propagate through the cover);
 - (b) circular cracks form at the upper surface of the cover at some distance from the load (noticeable sagging of the ice may occur);
 - (c) the ice shears in a circle immediately adjacent to the loaded surface (failure may be imminent).
- 3.3.4 The initial radial cracks may not be of immediate concern if the load bearing capacity of the ice is substantially higher than the load. However, prolonged application of the load should cause concern about possible ice failure.

3.3.5 Stationary loads should be moved under any of the following conditions:

- (a) when radial cracks develop;
- (b) if noticeable sagging is observed;
- (c) if the rate of sagging increases;
- (d) if continuous cracking is heard or observed;
- (e) if water appears on the surface of the cover.

3.3.6 The accumulation of drifted snow, often caused by stationary loads, may mask the indicators listed in paragraph 3.3.5 as well as increase the static load on the ice. Vehicles should be parked at least 5 lengths apart and in such a way that snow drifts do not interfere with other vehicles.

3.4 Effects of Speed

3.4.1 When a vehicle travels over an ice cover, a hydrodynamic or resonance wave is set up in the underlying water. This wave travels at a speed that depends upon the depth of the water, the thickness of the cover and the degree of elasticity of the ice. If the speed of the vehicle coincides with that of the hydrodynamic wave, the stress on the cover due to the wave reinforces that due to the vehicle, and can increase the maximum stress in the ice to the point of failure. The wave action tends to crack the ice in a checkerboard pattern.

3.4.2 Particular care should be exercised when approaching or travelling close to shore, or over shallow water, because of more severe stressing of the cover due to reflection of the hydrodynamic wave. Roads and vehicle approaches should meet the shoreline at an angle of not less than 45 degrees.

3.4.3 If the weight of a loaded vehicle is one-half or less than that determined from Figure I as safe for the thickness of the ice being used, speed is not critical. When the weight is greater, and for ice thickness less than 30 inches (75 cm), speed should be carefully controlled and in general be kept below 10 mph (15 km/h).

3.5 Cracks

3.5.1 The ice usually has many cracks made by thermal contraction or movements of the ice cover. Except at the thaw period cracks do not necessarily indicate a reduction in the load-bearing capability of the cover.

- 3.5.2 A dry crack with an opening of less than 1/8 inch (0.32 cm), which does not penetrate very deeply into the ice cover, will not cause serious weakening. Where a single dry crack in excess of one inch (2.5 cm) is noted, loads should be reduced by one third; for intersecting cracks of this size the loads should be reduced by two thirds. Dry cracks should be repaired by filling with water or slush.
- 3.5.3 A wet crack indicates that the crack penetrates completely through the ice cover and therefore affects the load bearing capacity, which should be reduced by one-half in the case of a single wet crack. If two wet cracks meet at right angles the reduction is to one-quarter of that for a good cover. Most wet cracks refreeze as strong as the original ice cover; however a core sample should be taken to ascertain the depth of healing.
- 3.5.4 Due to normal thermal contraction, cracks sometimes form at the middle of a road in the direction of travel; but these do not seriously reduce the bearing capability if they remain dry. If cracks form parallel to the road, at the sides, they do indicate over-stressing (perhaps by snow deposits from clearing operations) and possible fatigue due to excessive traffic. If such cracks develop, particularly if they are wet, road use should cease at once, and not be recommenced until the cracks are healed.
- 3.5.5 Fluctuating water levels may produce cracks near and generally parallel to the shoreline. These cracks are often accompanied by a difference in the levels of the floating and the grounded ice. If these cracks are wet, loads should be reduced accordingly. With extreme level differences, appropriate bridging repair (flooding, reinforcing) may be necessary.

3.6 Spring Thaw

- 3.6.1 Ice covers will begin to decay in the spring as the ice warms and begins to melt. The ice will thaw in the sunlight, but in the early spring may refreeze at night. Intensive thawing begins only in atmospheric temperatures above freezing.
- 3.6.2 Snow is a poorer thermal conductor than ice. A covering of 3 to 4 inches (7.5 to 10 cm) of clean snow on an ice bridge will reduce significantly the solar radiation penetrating the cover, thus prolonging the period of use.
- 3.6.3 Travel over an ice bridge displaying water on the surface should be executed with great caution and only if absolutely necessary. If mild weather continues and the water disappears, it may indicate that the ice is honey-combed, in which case the use of the area as an ice bridge should be discontinued immediately.
- 3.6.4 If the average air temperature has been above zero degrees Celsius for three days or more, then use of an ice-bridge should cease.

CHAPTER 4

Preparation of Ice Bridges

4.1 Building Techniques

- 4.1.1 A marked route over a natural ice cover can be utilized as an ice bridge, but since this may not provide sufficient strength for repetitive use, various techniques may be used to increase the safe load-bearing capability.
- 4.1.2 When temperatures are low and early winter use is not required, ice thickness can be increased by keeping the intended crossing snow-free, or by compacting the snow so that its normal insulating qualities are diminished. The natural rate of ice growth will thus be accelerated and the required thickness will eventually be reached.
- 4.1.3 If there is a need for a bridge when temperatures are not low enough to obtain the necessary natural thickness by the time of required use, the ice thickness can be increased by flooding: adding water on top of the existing ice cover.

4.2 Flooding

- 4.2.1 The flooding operation is normally carried out with small light-weight pumps, rather than larger pumps which are less portable.
- 4.2.2 Flooding may be started as soon as the natural ice is about 3 inches (7.5 cm) thick and strong enough to bear the weight of persons and pumps. The initial flooding should be limited to a depth of about one inch (2.5 cm).
- 4.2.3 Subsequent floodings or "lifts" should be limited to that depth of water that will freeze within 12 hours. As a rule of thumb, an average air temperature of -18 degrees Celsius will freeze 2 inches (5 cm) of water overnight. With average temperatures of -31 degrees Celsius or lower, lifts may be increased to 3½ inches (9 cm). Wind or snow on the surface will increase or decrease the freezing rate respectively.
- 4.2.4 Thicker lifts can lead to a layer of water between the old ice surface and the new layer of ice. When covered by succeeding lifts of warm water, this layer may not freeze until well after the bridge has been completed. Such lifts may also overload and crack the existing ice cover.

- 4.2.5 To achieve maximum strength in the bridge, any snow cover should, if possible, be removed before each flooding operation. However, dragging or packing the snow to an even thickness and then flooding--"slushing"--provides a thicker sheet in less time but the resulting ice is not as strong.
- 4.2.6 If banks of snow are constructed on each side of the bridge to contain the flooding, they should be at least 150 feet (45 metres) apart; however, a 200 foot (60 metre) wide bridge is preferable.
- 4.2.7 Snow banks may leak after freezing has begun so that a crust of ice is formed with an air-filled void between it and the initial ice cover.
- 4.2.8 Flooding should take place from the bridge centre line, letting the water feather out to seek its own level. This method also provides a wider bridge surface.
- 4.2.9 Ice formed by the flooding process will be stress-free if each lift is allowed to become completely frozen before the next flooding.

4.3 Reinforcement

- 4.3.1 An ice bridge built in more temperate climates or intended for repeated use may be reinforced with grasses, brush or logs. Such a bridge can then take a greater load for the same thickness, being held together by the reinforcing inclusions. It can heal itself more easily after cracking and is less likely to fail catastrophically.
- 4.3.2 One disadvantage to reinforcement is the added time and effort required for construction. Another is the effect of local radiational heating of the reinforcing inclusions, particularly during the spring thaw, which will increase the rate of decay of the bridge.
- 4.3.3 It is preferable to locate the reinforcing items in the bottom portion of the final ice bridge; they should be placed and frozen in as early as possible.
- 4.3.4 Reinforcing logs, properly placed in an ice bridge, will make possible a reduction of ice thickness of up to 25 per cent.

4.4 Maintenance

- 4.4. On completion, the following rules should be observed in order to increase the safety and life of the ice bridge:

- (a) The bridge must be kept clear of excessive snow, and the snow banks kept well back, with slopes of no more than a ratio of 1 to 5. The weight of snow banks can weaken the ice underneath and form relatively deep ditches by slow sagging, and therefore should be levelled out if higher than 3 feet (1 metre) or two thirds of the ice thickness, whichever is the larger.
- (b) A covering of 3 to 4 inches (7.5 to 10 cm) of compacted snow will give good traction and will also provide a cushion. Glare or snow-free ice breaks up rapidly under traffic in extreme cold.
- (c) The surface should be kept clear of dirt or other dark material, such as oil spots, which will absorb solar radiation and melt into the ice. Puddles of water also absorb heat from the sun and should be "repaired" by filling with snow.
- (d) The ice bridge should be checked for cracks daily and on foot, and its thickness measured as outlined in article 3.2. A longitudinal crack more or less down the centre line may occur, particularly if the ice thickness has been increased by flooding. If dry, this crack is not serious. Wet cracks should be repaired immediately and loads reduced until the re-freezing process is completed (see article 3.5).

4.5 Operating Precautions

- 4.5.1 Following are a number of general precautions which should be taken when testing for ice thickness or crossing ice covers:
- (a) All persons involved in operations over ice covers should be familiar with the hazards involved, the precautions to be taken and the basic rescue techniques required in case of a breakthrough.
 - (b) Single persons or single vehicles should not venture onto an ice cover when there is no help at hand.
 - (c) When testing, persons on foot should carry long poles, to be used as an aid to rescue in case of breakthrough, or alternatively be securely roped together, with minimum spacing of 50 feet (15 m).
 - (d) Light vehicles used during tests periods and initial build-up should be equipped with an extended frame of logs to provide support if the vehicles break through the ice cover.

- (e) A rope at least 50 feet (15 m) long, or equivalent to water depth, with a float, may be attached to test vehicles as an aid to marking and recovery.
- (f) Vehicle doors and cab hatches should be removed or lashed open; seat belts must NOT be worn.
- (g) Adequate spacing must be maintained between vehicles; it is recommended that an interval of at least 100 feet (30 m) be observed.
- (h) Vehicle speed should not normally exceed 10 mph (15 km/h) in order to avoid the effects of the hydrodynamic wave, nor should speed be less than 1 mph (1.5 km/h) in order to avoid the effects of a stationary load.
- (i) Where practicable, precautionary and speed limit signs should be erected at each end of the ice bridge, and the route across the ice cover clearly marked.
- (j) Traffic lanes should alternate across the width of the ice bridge, working gradually from one side to the other before starting over again. This reduces the danger of deterioration of the ice and makes possible a choice of routes if dangerously cracked areas develop or breakthrough occurs.
- (k) Equipment required for rescue operations, such as "mats" (chained or wire-linked small logs or heavy planks as a platform for rescue vehicles) jacks, hoists, etc., should be available near by.
- (l) Frequently it is the second vehicle in a convoy which encounters ice failure problems. Before a second heavily loaded vehicle proceeds along the ice bridge, it is advisable to have it preceded by a more lightly loaded vehicle to check the route.
- (m) For a period of 24 hours after a marked drop in temperature, or following the removal of snow from the ice cover during periods of low temperature, loads should be reduced by 50 percent and night-time travel should be discouraged.

CHAPTER 5

The Use of Snowmobiles on Ice Covers

5.1 General

- 5.1.1 Drownings resulting from snowmobiles going through ice are the greatest single cause of fatalities arising out of the use of these machines. However, snowmobile operations over ice covers can be conducted safely by using common sense and observing the basic precautions.
- 5.1.2 As the total load--machine, operator and ancillary gear--may weigh approximately 500 pounds (225 kg) or more, a substantial thickness of ice is required for support.
- 5.1.3 Difficulties in control, steering and stopping are increased on snow-free ice, particularly at higher speeds.

5.2 Operating Precautions

- 5.2.1 The following is an outline of some of the basic precautions:
 - (a) Where there is an alternative, single machines should not be operated unaccompanied over ice covers.
 - (b) Should single machine operation be unavoidable, the shore base should be notified of the route to be taken, the destination and probable time of return.
 - (c) Operations should not be conducted over ice covers less than 6 inches (15 cm) thick.
 - (d) Operators should know of and avoid locations where currents or springs may cause dangerous thinning of the ice cover.
 - (e) Fog may indicate the proximity of open water; speed should be reduced and great care taken.
 - (f) When unexpectedly encountering open water normal action is to slow down, brake gently and turn away; otherwise, turn as sharply as possible. If a turn cannot be made in time or a skid results, the operator should roll off the machine.
 - (g) Glare from the sun and ice may obscure obstacles or dangerous areas; anti-glare sun glasses should be worn under these conditions.

- (h) Operations at night or at high speeds should be restricted to well marked and known safe trails or crossings.
- (i) Unless essential, snowmobiles should not be operated on ice bridges or roads with other types of traffic.
- (j) Avoid operating over slush or water-covered ice, but if unavoidable, ensure that the tracks are cleared of ice and slush.

References

Additional technical information concerning ice formation and its use is available in the following publications:

Publication CLI-7-71
"Freeze-up and Break-up Dates of
Water Bodies in Canada"
Information Section
Central Service Directorate
Atmospheric Environment Services
Environment Canada

Technical Memorandum No. 56
"The Bearing Strength of Ice"
National Research Council

Research Paper No. 469, NRRCC 11806
"Use of Ice Covers for Transportation"
National Research Council

Information and advice may be obtained also from the "National Research Council of Canada, Division of Building Research, Geotechnical Section, Ottawa, Ontario, K1A 0R6".

